FACTORS AFFECTING COMMUNITY PARTICIPATION IN SOLID WASTE MANAGEMENT IN LINDI MUNICIPAL COUNCIL TANZANIA

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2015

CERTIFICATION

The undersigned certifies that she has read and hereby recommends for acceptance by the Open University of Tanzania a dissertation entitled**: *"Factors Affecting Community Participation in Solid Waste Management in Lindi Municipal Council Tanzania."*** in partial fulfillment for the requirements of degree of Master of Environmental Studies (Health) of the Open University of Tanzania.

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Dr Irene Aurelia Tarimo

(Supervisor)

……..

Date

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DECLARATION

I **Richard Augastino Shabani**, do hereby declare that this dissertation is my own original work and that it has not been presented and will not be presented to any other University for similar or any other degree award.

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Signature

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Date

DEDICATION

This dissertation is dedicated to my wife Agnes and my son Daniel for their spiritual and moral support for entire period of this study. I know that it was difficult moment on my side to allocate time for study and sometime to resume responsibility as husband and father respectively. I sincerely call upon them to share with them any credit that may be accorded to me.

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Also I would like to thank the District Administrative Secretary of Lindi District and in particular Lindi Municipal Council Director for granting me permission to embark on this study in Lindi Municipal Council. Furthermore I extend my thanks to Ward Executive Officers of Mtanda, Rahaleo and Mwenge Wards where the study was conducted and all the respondents for their consent and cooperation during the study period.

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ABSTRACT

The study focused on factors affecting community participation in solid waste management in Lindi Municipal Council Tanzania. The aim was to identify the determinants and motives for the household's willingness to pay for the improvement of solid waste management services. A stratified random sampling technique was used to select the respondents to participate in this study. Data were collected using interviews, administered questionnaires, observations and documentary reviews. A total of 135 household members participated in the study from the three Wards. In first objective the results revealed that majority which is 92% of the household members were willing to pay for the solid waste management services. In assessing satisfaction on solid waste management services provided, it was revealed that about 24% of respondents only were satisfied with the services. About 70% of the respondent reported to be aware on the knowledge of public health problems associated with poor solid waste management. Further the results indicated that female were more willing to pay for 94% as compared to the males. The perception that Municipal Council has the sole responsibility for solid waste management services is still persisting with about 28% of the respondents. The second objective of the study indicated that about 59% of the respondents were not satisfied with the solid waste services provided. Furthermore, it is revealed that about 41% of respondents said there is weak enforcement of laws and regulations for solid waste management. About 88% of the respondents claimed that penalty imposed to those who breach the solid waste regulation were light. It is recommended that the Local Government Authorities (LGAs) should strengthen the enforcement of the existing laws and the regulations and increase budget allocated for solid waste management but also should educate the the community on solid waste management. Further study with similar nature should be conducted widely to make comparison for the best way of managing solid waste and a model as how solid waste management should be coordinated, developed and implemented.

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LIST OF ABREVIATIONS

CBOs	Community Based Organizations.
EMA	Environmental Management Act.
ILO	International Labour Organization.
LGAs	Local Government Authorities
M&E	Monitoring and Evaluation.
MDGs	Millennium Development Goals.
NEP	National Environmental Policy.
NGOs	Non Governmental Organizations.
PHA	Public Health Act.
SPSS	Statistical Package of Social Sciences.
SWM	Solid Waste Management.

CHAPTER ONE

INTRODUCTION

1.1 Background of the problem

Waste is directly linked to human development, both technologically and socially. The composition of different wastes varied over time and location, with industrial development and innovation has directly linked to waste materials. Some components of waste have economic value and can be recycled once correctly recovered (Awunyo, *et al.*, 2013).

Waste includes all items that people no longer have any use for, which they either intend to get rid of or have already discarded. Many items can be considered as waste example, household rubbish, sewage sludge, wastes from manufacturing activities, packaging items, discarded cars, old televisions, garden waste, old paint containers (European Environment Agency, 2013), therefore all our daily activities can give rise to a large variety of different waste arising from different sources.

Municipal waste problem is frequently discussed and it becomes the main issue in an urban management. In fact, the issue of waste management is becoming more complex and challenging in the future due to the tremendous growth in urban population and their consumption patterns. It is argued that the greater the economic prosperity and the higher percentage of urbanization, the greater the amount of solid waste produced and managing waste will become more complex (Hassan, 2000).

Moreover, Solid Waste Management is a crucial public service issue affecting both environment and public health. That means it is not only limited to the collection of

waste and its disposal, it requires the clear strategies for collection, transportation, sorting and recycling of waste. Solid waste management is highly affected by the culture of the people and their level of awareness.

Municipal waste is generated by households, commercial activities and other sources whose activities are similar to those of households and commercial enterprises. Municipal waste is made up to residual waste, bulky waste, secondary materials from separate collection like paper and glass, household hazardous waste, street sweepings and litter collections. It is made up of materials such as paper, cardboard, metals, textiles, organics from food and garden waste and wood (European Environment Agency, 2013).

Humans generate a great deal of waste as a by-product of their existence. This is evidenced at dumping pits located in or around residential sites. Every task, from preparing a meal to manufacturing a computer and so forth, is accompanied with production of waste material which cannot be used for other things and needs to be disposed of effectively (Awunyo, *et al.,* 2013). That means if waste is not contained and handled appropriately and in sanitary manner, there are great chance of creating favorable conditions for causing public health problems such as diseases like cholera, diarrhea, typhoid including favorable breeding ground for flies, cockroaches, mosquitoes as well as potential environmental and air pollution (Pinnock, 1998).

However, some people discarded waste may have value to others, this is evidence fashionable income generating activities that in most dumping site and even in streets in urban and cities and make it to be recognized that waste materials are a valuable resource. Poor management of Solid waste can also affect ground water and marine ecosystems. Consequently everyone has to be involved for effective and efficient Solid

Waste Management systems (SWMs). Apart from the consequence that may be caused by poor waste management, still with proper arrangement waste can be a resource and used to provide employment opportunities that may contribute to poverty alleviation if the populations are informed, educated and included in the solid waste management decision making process (Squires, 2006).

Transportation of waste is a major issue in most developing countries including Tanzania as appropriate disposal sites may be remote. Frequently, subscription pick-up services are available for people paying a flat fee to have their waste picked up and disposed of. Other people can also subscribe to specialty services, like medical waste pick-up services, or confidential paper shredding and disposal services.

Waste management practices is another challenge as it differ for developed and developing nations, for urban and rural areas and for residential and industrial producers. For instance, a study by Awunyo, et *al.,* 2013*,* indicates that in some cases management for non hazardous residential and institutional waste in metropolitan areas is usually the responsibility of local government authorities, while management for hazardous commercial and industrial waste is usually the responsibility of the generator or waste producer.

The situation shows that rapid urbanization and changes in the pattern of life, give rise to generation of increasing quantities of wastes which causes another threat to our already degraded environment. At this time the world is now facing an extreme situation of waste management from both the side, from industrialization and municipal waste management especially in the under developed countries (Kamara, 2011).

According the prevailing situation of SWM there are a need for the concerned authority to ensure the enforcement of policy, regulation and law governing the SWM if exist and those without there are a necessity of formulation. The current practice of solid waste disposal in big proportion is simply removing it from cities areas and dumps it in rural or deserted areas to be forgotten (Wikipedia, 2013).

In Tanzania, Local Government has been given duty to manage and minimize solid waste (Environmental Management Act, 2004). Furthermore the authorities have been assigned duty to perform and undertake services of solid and liquid waste management (Public Health Act, 2009). Despite of having good law and regulation as well as by law on SWM still the situation of solid waste management is not convincing, the problem here is how these laws and regulations are enforced.

Implementation and enforcement of waste regulations and conventions is severely constrained by the lack of good governance, transparency and prevalence of corruption in some cases. Lack of awareness, community participation and appreciation of best practices for environmentally sound management of wastes is a major constraint (Jumanne, 2010).

However, the challenges of SWM in Lindi Municipality like other municipality in developing countries continue to be one of the most pressing challenges if the relevant mitigation measures are not taken for the coming decades. The magnitude of the problem is likely to increase with the population growth and potential economic activities in the southern zone in particular Lindi municipality following exploration of nature gas and other economic opportunities in Lindi Region.

There is a need to address the problems in such a way that should be solution which can give proper management of both kind of waste. For this purpose public awareness about the waste management can play a crucial role in controlling the waste generated by community members.

The obstructed mindset, that SWM generally is the local government's responsibility, in terms of planning and financing through own sources allocated, thus making the municipal authority to have sole responsibility for waste collection and transfer to final disposal (Jumanne, 2010).

Very little proportion is been carried by small community groups in a small scale. The situation tend to increase the irresponsibility to the household as well as individual community members not to care for the waste they produce and this accelerate in indiscriminate disposal of waste.

The average municipal waste produced in Lindi Municipality is 55.66 tons per day (Lindi Municipal Annual Report, 2013) while according to reports of the Municipality the capacity for collection for disposal per day is 13.3 (24%) this means 42.36 (76%) tons remains accumulating within the residence surroundings.

The situation is unhealthy, it provide favorable breeding ground for vermin and insects to breed and creates a potential sources for air pollution, contamination to surface and underground water sources. In the nearby future we expect to have influx of people in Lindi with huge exploration of natural gas. Moreover the model style of living of people that demand more of semi and processed packed food anticipated to increase the rate of

waste produced at household level. We expected the situation could increase cost for waste management if everything will be left on the shoulder of the Municipal Council without involve the community whose are responsible for the production of waste to contribute for the management aspect of their waste produced.

According to the prevailing situation Lindi Municipal Council, the problems of solid waste collection and disposal is well beyond the ability of the Council own sources to tackle, therefore there are necessity for effectively involvement of the community in SWM for the improvement of the situation.

1.2 Statement of the Research Problem

Lindi Municipal Council Annual report, (2013) indicated that the average solid waste generation per day was 55.66 tones while the capacity of collection for disposal per day was 13.3 (24%) tones. This implies that 42.36 tones (76%) of solid waste produced was not collected and disposed in a coordinated manner with the Municipal authorities. It was pointed out that lack of designated vehicles (compacters) for solid waste disposal as currently they had only one vehicle which is too old and it is used in multipurpose way as it is not designated for solid waste disposal only. Furthermore, low community participation in the cleaning day announced by the Municipal Council and inadequate fund allocated for solid waste management services are among the reasons that hamper solid waste management in Lindi Municipal Council. This contributes to public health and environmental problems due to the fact that the rate of waste produced does correlate with the effort made by the Municipal Council in an attempt to collect and dispose the waste. The comparative low enforcement of laws, by-laws and regulations on solid waste management is another challenge facing the Municipal Council in addressing solid waste

management. However, very little has been done to assess the households' willingness to pay for improved waste management services. The question then is that are the households ready to pay? And what factors determine their motivation to pay and the amount of money they are willing to pay? This study therefore, aims to investigate factors affecting community participation in Solid Waste Management (SWM) in Lindi municipal Council, Tanzania**.**

1.3 Purpose of the Study

The purpose of the study is to assess the determinants of household's willingness to pay for improvement of solid waste management services. The amount of money paid will help the Municipal Councils to have capacity to deal with SWM at an expected level.

1.4 Significant of the Study

The study to investigate factors affecting community participation in solid waste management in Lindi municipality, Tanzania will contribute knowledge to various aspects of solid waste management through involvement community. Community participation been recognized as success factor in waste management (Subash, 2002). The study will add fact to policy and decision makers on the importance of community participation for the improvement of solid waste management.

The study will also contribute knowledge to the field of health and environment in relation to waste management. The study will be used as reference material and as starting point for further research of the same nature in the similar climatic environmental conditions.

1.5 General Objective of the Study

To investigate factors affecting community participation in solid waste management (SWM) in Lindi Municipal Council, Tanzania.

1.6 Specific Objectives

i. To identify the determinants of households' willingness to pay for improved solid waste management services.

ii. To determine the motive factors for the community to participate on solid waste management.

1.7 Research Questions

i. What are the determinants of households' willingness to pay for improvement of solid waste management services?

ii. Which motive factors that can influence the community to participate on solid waste management?

1.8 Limitation of the Study

The study is limited to descriptive explanation; it covered the aspect of determinants and motive factors for the community to participate in the improvement of solid waste management.

CHAPTER TWO

LITERATURE REVIEW

2.1 Solid Waste Management

Solid waste Management may be defined as systematic administration of activities that provide for the source separation, storage, collection, transportation, transfer, processing, treatment, and disposal of solid wastes. The objective of SWM is basically the efficient use of resources in the process of managing waste materials (Tchobanoglous, 2009).

Solid wastes by definition include refuse from households, non-hazardous solid waste from industrial and commercial establishments refuse from institutions market waste, yard waste and street sweepings. Broadly, household wastes otherwise known as residential or domestic wastes are made up of wastes that are consequences of household activities. It include food preparation, sweeping, cleaning, fuel burning and gardening wastes old clothing, old furnishings retired appliances, packaging and reading materials and where diapers or bucket latrines are used, household waste include feacal material (White, *et al.,* 2012).

Waste is directly linked to human development, both technologically and socially. The composition of different wastes has varied over time and location, with industrial development and innovation being directly linked to waste materials. Some components of waste have economic value and can be recycled once correctly recovered (Awunyo, *et al.,* 2013).

Waste, or rubbish, trash, junk, garbage, depending on the type of material or the regional terminology, is an unwanted or undesired material or substance. It may consist

of the unwanted materials left over from a manufacturing process (industrial, commercial, mining or agricultural operations) or from community and household activities. The material may be discarded or accumulated, stored, or treated (physically, chemically, or biologically), prior to being discarded or recycled. It is also used to describe something we use inefficiently or inappropriately (European Environment Agency, 2013).

Wastes are materials that are not prime products (that is products produced for the market) for which the initial user has no further use in terms of his/her own purposes of production, transformation or consumption, and of which he/she wants to dispose. Wastes may be generated during the extraction of raw materials, the processing of raw materials into intermediate and final products, the consumption of final products, and other human activities. Residuals recycled or reused at the place of generation are excluded (Tchobanoglous, 2009).

Waste includes all items that people no longer have any use for, which they either intend to get rid of or have already discarded. Additionally, wastes are such items which people are require discarding. Many items can be considered as waste e.g., household rubbish, sewage sludge, wastes from manufacturing activities, packaging items, discarded cars, old televisions, garden waste, old paint containers (European Environment Agency, 2013). Thus all our daily activities can give rise to a large variety of different wastes arising from different sources. Waste is often found as a liquid or solid form. Solid waste is any type of wastes which is hard non liquid form; for example, used plastic bags, broken bags, leftover food or foods remains and the like (ILO, 2007). It is a by-product of human activities that tends to increase with the rate of

urbanization, changing patterns of consumption and the improvement of living standards (ENPHO, 2008).

Rouse (2008), define Solid waste as material which no longer has any value to its original owner, and which is discarded. The main constituents of solid waste in urban areas are organic waste (including kitchen waste and garden trimmings), paper, glass, metals and plastics. Ash, dust and street sweepings can also form a significant portion of the waste.

Municipal waste has traditionally been land filled and this remains the predominant management option in most countries. However, some countries have taken significant steps away from landfill. Alternatives offered include incineration (increasingly with recovery of energy) composting and recycling of glass, paper, metal, plastics and other materials. There are numerous potential impacts associated with the land filling of waste including the production of leachate and landfill gas, odours, flies, vermin and the use of land (European Environment Agency, 2013).

Municipal waste prevention means eliminating or reducing the quantity of waste which is produced in the first place, thus reducing the quantity of waste which must be managed. Prevention can take the form of reducing the quantities of materials used in a process or reducing the quantity of harmful materials which may be contained in a product. Prevention can also include the reuse of products. Prevention is the most desirable waste management option as it eliminates the need for handling, transporting, recycling or disposal of waste. It provides the highest level of environmental protection by optimizing the use of resources and by removing a potential source of pollution.

In the developing countries, solid waste management has been identified as a priority area to be addressed as part of the sustainable development plans. Comprehensive solid waste management systems are being developed with an overall goal of pollution prevention, control and maximization of waste as a resource. Therefore, apart from the planning and implementation of sound solid waste management systems, it is the responsibility of waste managers to operate based on sustainable development goals (Pinnock, 1998).

Management should be facilitated by Monitoring and Evaluation (M&E) systems which would guide corrective action on an on-going and periodic basis. Solid waste management controls have to address likely impacts on air quality (odour and noise), soil, ground water, marine environment and impacts on human safety and health. The stages of the solid waste management cycle include: Waste generation, Pre-collection, storage, collection, transportation, treatment (incineration, recycling, reuse, and composting) and Final disposal (European Environment Agency, 2013).

Waste Management it include waste minimization that is an approach aims at reduce the production of waste through education and the adoption of improved production processes and less wasteful practices. Recycling by separate certain materials within the waste stream and reprocessing them. The recycling of many materials is currently not financially viable Waste processing is treatment and recovery (use) of materials or energy from waste through thermal, chemical, or biological means (Wikipedia, 2013). The concept of waste is often that of an otherwise useless or discarded material. However, the idea of what constitute a waste is often notional rather than a concrete term because waste is more easily recognized than defined. The concept of solid waste

according to Furedy and Lardinios (2000) is therefore very tricky to define. In that light, it becomes clear perception of what contributes a waste are likely to differ widely and that the divide between a waste and resource may be indistinguishable (Baird and Cann, 2005).

A waste is therefore what the person responsible for discarding the material regards as a waste. Generally, materials discarded for disposal are deemed to be wastes (Furedy and Lardinios, 2000). Based on this controversy, a material is only defined as waste if it is useless; as soon as it is usable it becomes a resource (Fobil, *et al*., 2007).

2.2 Types and Sources of Solid Wastes

Solid waste classified based on its origin, risk potential, or characteristics. Based on origin, solid waste can be classified in to food waste, rubbish, ashes and residues, agricultural waste, municipal waste, industrial process waste, and demolition and construction wastes. With regards to characteristics, it also classify as biodegradable and non biodegradable.

In addition, based on its risk potential, again it can be categorized in to hazardous and non hazardous wastes (CED, 2003). However, solid wastes are usually classified based on their sources (from which they emanate). Based on this bench mark, it can be categorized in to domestic or household, commercial, institutional, industrial, municipal services, construction and demolition, agricultural wastes.

2.3 The Theory of Planned Behavior in Relation to Willingness to Pay for Solid Waste

The theory states that attitude toward behavior, subjective norms, and perceived behavioral control, together shape an individual's behavioral intentions and behaviors. (Fishbein and Ajzen, 1975). According to the theory of reasoned action, if people evaluate the suggested behavior as positive (attitude), and if they think their significant others want them to perform the behavior (subjective norm), this results in a higher intention (motivations) and they are more likely to do so.

The morale and commitment of household participation in solid waste management depends to a large extent on the ways in which the Municipal Council coordinates appropriate measures of solid waste management implementation and cultural aspect of the community.

Poor coordination in Municipal Councils and negative cultural aspect of community in relation to solid waste management affect the willingness of the community to pay for improved solid waste management.

The theory contains six main elements which are Behavioral intention, Subjective norms, Social norms, Perceived power and Perceived behavioral control, (Fishbein and Ajzen, 1975). Collectively represent a person's actual control over the behavior on willingness to pay for improve solid waste management. Household members develop their willingness to pay behavior positively or negatively according to subjective and social norms. If they recognize that their significant others and social pressure respond to such behavior they change their behavior.

The key concept variables that influence an individual willing to pay for the improved solid waste management include

2.3.1 Behavioral Beliefs and Attitude toward Behavior

Behavioral belief this refers to an individual's belief about consequences of particular behavior. The concept is based on the subjective probability that the behavior will produce a given outcome, (Fishbein and Ajzen, 1975). If the majority claimed that the Municipal Council do not have capacity to provide solid waste management services. This situation might hinder the attitude of one willing to paying for improved solid waste management, thus there are needs for strong effort to increase awareness to community on the importance of participation on solid waste management. However, they should be well defined roles and responsibilities of every organizations and individuals which is supported by existing laws and regulation of solid waste management.

Attitude toward behavior this refers to positive or negative evaluation of self-performance of the particular behavior of an individual, (Fishbein and Ajzen, 1975). The concept is the degree to which performance of the behavior is positively or negatively valued. It is determined by the total set of accessible behavioral beliefs linking the behavior to various outcomes and other attributes. If majority of the household would be willing to pay for the improved solid waste management in Lindi Municipal that provide positive attitude toward on willingness to pay.

2.3.2 Normative Beliefs and Subjective Norms

Normative belief this refer to an individual's perception of social normative pressures, or relevant others' beliefs that he or she should or should not perform such behavior, (Fishbein and Ajzen, 1975). This concept suggested that if majority of individual do not value the importance of participation in solid waste management and there is no any effort made to make them participate, then the community member would develop the attitude of assuming it is just a **norm** phenomenal for not participating in the solid waste management. In other hand if majority assume the responsibility of participating, the situation will persuade to belief that is just a normal behavior to participate in solid waste management.

Subjective norm this refer to an individual's perception about the particular behavior, which is influenced by the judgment of significant others, (Fishbein and Ajzen, 1975). It is observed that in Lindi Municipal there is inadequate coordination of solid waste management but also the low enforcement of existing solid waste laws and regulation, this situation does not influence an individual to adopt positive attitude of participating in solid waste management. Therefore, law and regulation enforcement by the authority is high need in order stimulate individual perception to subjective norms.

2.3.3 Control Beliefs and Perceived Behavioral Control

Perceived behavioral control this refers an individual's perceived ease or difficulty of performing the particular behavior, (Fishbein and Ajzen, 1975). It is assumed that perceived behavioral control is determined by the total set of accessible control beliefs. According to this concept it reflect how is the Municipal Council provide the mechanism of which made someone to participate in solid waste management service.

A well organized and appropriate mechanism could provide an individual morale behavior of easily participating in the solid waste management services or otherwise.

2.3.4 Behavioral Intention and Behavior

Behavioral intention this refers to an indication of an individual's readiness to perform a given behavior, (Fishbein and Ajzen, 1975). It is assumed to be an immediate indication of behavior. It is based on attitude toward the behavior, subjective norm, and perceived behavioral control, with each predictor weighted for its importance in relation to the behavior and population of interest. The willingness to pay will be determined in first place by the total behavior of an individual. If an individual value environmental health, he or she would like to life in clean environment free from any kind of pollution and this will lead to positive intentional behavior of participating in the solid waste management services.

Behavior this refers to an individual's observable response in a given situation with respect to a given target. Ajzen said a behavior is a function of compatible intentions and perceptions of behavioral control in that perceived behavioral control is expected to moderate the effect of intention on behavior, such that a favorable intention produces the behavior only when perceived behavioral control is strong.

2.4 Determinants and Motive Factors for the Community Participation in Solid Waste Management

The determinants and motive factors for the community participation in solid waste management can be summarized by the model/conceptual frame work.

2.5 Conceptual Frame Work

The model explain the determinants of community willing to participate in solid waste management in relation to motive factors that influence an individual to take part in solid waste management. The participation is related with various determinants such as age, education, marital status. Family size, economic, settlement arrangement, while motive factors that can influence voluntary participation such as individual attitude and behavior, healthy condition.

When these determinants and motives factors are considered effective as the driving force for community to participate in solid waste management we anticipation the condition of solid waste management will be improved.

Solid Waste Management

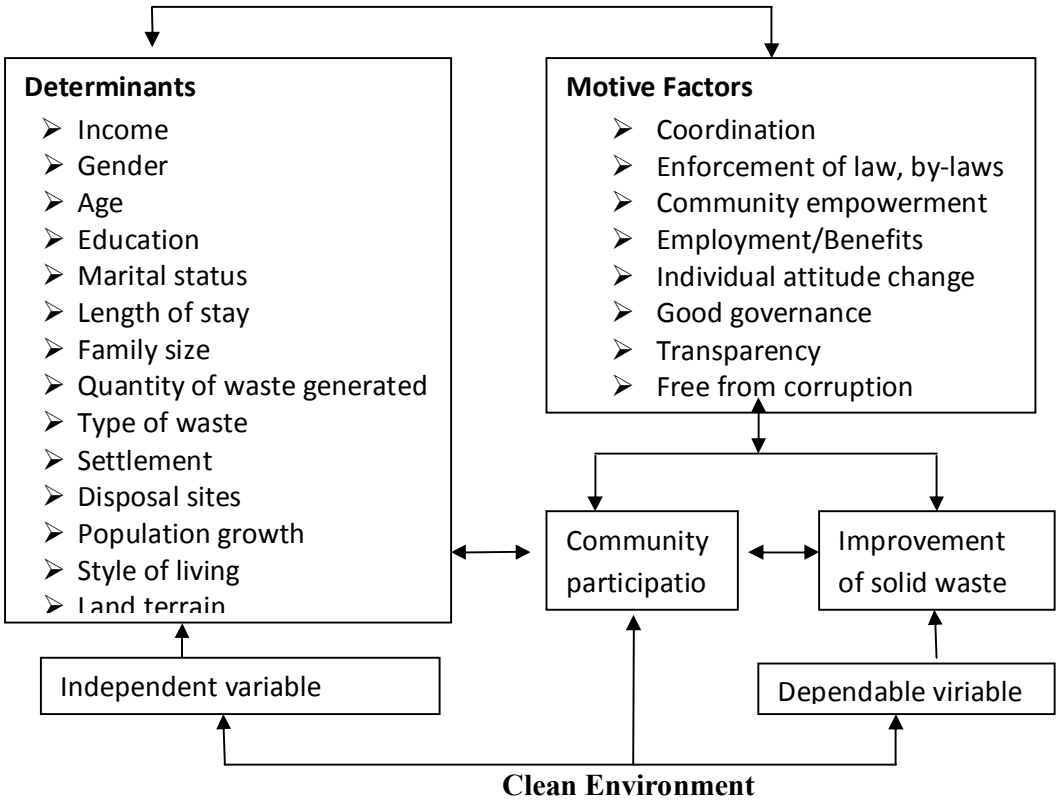

Figure 2. 1 Model/Conceptual frame work for community participation in solid waste management

2.5.1 Income

An income refers to the income of the head of the household from all sources. There is a general agreement in the environmental economics literature on the positive relationship between income and demand for improvement in environmental quality (Awunyo, *et al.,* 2013). Therefore, we expect the income to affect the willingness to pay and its amount positively. The finding in the study of urban household's willingness to pay in improve solid waste disposal services in Kumas Ghana confirmed that general agreement in environmental economics literature on the positive relationship between income and demand for improvement in environmental quality.

2.5.2 Gender

Female respondents are more willing to pay for improved solid waste management than males, since traditionally it is the role of women to clean the house and dispose of the waste (Addai and Danso-Abbeam, 2014).

Even though the proportion of males to females' respondents is 62% to 38%, one does not expect this disparity to greatly influence the people's attitude and perception on household waste management. Recent findings however suggest that gender difference could influence people's perception on solid waste management (Ehrampoush and Moghadam, 2005).

Many authors have analyzed the effects of socioeconomic and cognitive variables on household's willingness to pay for a service. Afroz, *et al.* 2009 in their analysis on the household's willingness to pay for improved solid waste management in Daka city,

Bangladesh maintained that age, household size and income maintain an increasing function with consumers' willingness to pay for improve solid waste management system. However, they found female to have positive influence on consumers willing to pay and males to have negative influence on consumers willing to pay Niringiye (2010) confirmed the findings of Afroz, *at el.* 2009 by stating that these variables and other variables like household expenditure, quantity of waste generated and consumer's level of education also pose a significant influence on consumers willing to pay (Addai and Danso-Abbeam, 2014).

2.5.3 Age

According to different researchers ages have shows mixed result (Afroz, *et al.* 2009) pointed out that holding all other factors constant, older people are willing to pay more than younger people. This suggest that older citizens are more mature decisions related to evaluating health and environmental issues, possibly due to their age , leading them to express high willingness to pay value. However, according to Aggrey & Douglason (2010) and (Awunyo, *et al.* 2013), age affects willingness to pay waste management negatively. Old people may consider waste collection as government's responsibility and could be less willing to pay for it. Whiles the younger generation might be more familiar with cost sharing and could be willing to pay.

Addai & Danso-Abbeam, (2014). Reveal that middle age group in the age range of 21 to 60 were found to be more willing to pay for improved municipal solid waste than older ones (above 60) and younger ones (below 20). This was because old people (above 60) considered solid waste management as government's responsibility while young ones (below 20) just did not feel responsible for improved solid waste management and were

therefore less willing to pay for it. The middle age generation, with big family responsibilities, better understood the implications of poor municipal solid waste management and were more familiar with cost sharing and were therefore more willing to pay for improved municipal solid waste management services.

2.5.4 Education

This variable is taken to capture the number of years the respondent spent informal school system. Education is expected to have positive and significant effect on waste management. Thus, the longer period the individual spent in formal school system, the more likely that he/she would be willing to pay more for improved waste management. The household respondents who had attained secondary, post-secondary and graduate level education were more willing to pay for improved solid waste secondary and graduate level education were more willing to pay for improved solid waste management (Okot, *2012*).

Niringiye (2010) hypothesized that the higher the level of education the more people would appreciate the consequences of mishandling of solid waste and the more value the individual would give in order to avoid the risk of being a victim of unclean environment. (Afroz *et al.* 2009) also reiterated the fact that education relates to a better understanding of the problem of solid waste and hence willing to ,pay for waste management willing to pay for waste management.(Addai and Danso-Abbeam, 2014).

2.5.5 Marital Status

The marital status of the household head is expected to influence the value the individual places on waste management. This is due to the fact that married people are

likely to be more responsible to keep the environment clean and hence are more likely to be willing to pay more for improved waste management (Aggrey and Douglason, 2010).

2.5.6 Length of Stay

This refers to the number of years the household has been living in the area. This is expected to influence the willingness to pay in the positive direction, since the longer the year the household has been there, the more they would understand the problem of solid waste management of that area, and the more they would be willing to pay for improvement in the waste management.

2.5.7 Family Size

This refers to the number of household members. This variable is expected to have influence positive or negative on the willingness to pay. This is due to the fact that the more children in the household, the more they would prefer to use their children to clean the environment than paying more to the Municipal authorities to clean the environment. However, the more number of people in the household, the more the waste generated, hence disposal becomes a problem, therefore it expected to be more willing to pay in order to keep a clean environment (Niringiye, 2010).

2.5.8 Quantity of Waste Generated

This variable stands for the quantity of waste the household generates within a week. For the purpose of this study, the unit of measurement used is a shopping plastic (polythene) bag (30 Ghana pesewas worth), which is common as a convenient means for measurement to most respondents during the survey. The study hypothesizes the

willingness to pay to be positively related with the quantity of solid waste generated, since the higher the generation, the more would be the problem households' face in storage and taking the waste for collection, and they would be willing to pay more (Okot, 2012).

2.5.9 Responsibility for Solid Waste Management

Proxy to examine the attitude of the respondents towards who should manage waste in the Municipal Councils, positive attitude towards cost sharing to influence the willingness to pay in the positive direction. Still there is perception that the government has the sole responsibility for solid waste management services. The negative attitude towards community participation to solid waste management service and left all the burden of waste management service on the shoulder of Municipal Councils and cause most of our Municipal Councils to be in poor state of environmental health.

2.5.10 Tenancy/Housing Arrangement

Those living in their own houses are expected to be more willing to pay for the improvement as compared to their tenants. This is because the house belongs to the owners and if the place is clean they may have a higher value for their properties.

2.5.11 Social Demographic Factors

Some scholars such as Shen and Saijo 2008, argue that demographic factors such age, income, and education affect people's behavior towards the environment while others believe that public environmental awareness is a factor of consumer decision making.

Diamantoplous, *et al.* 2003, focused in his studies on developed countries such as the United State and he concluded that the correlation between people and environmental

concern is characterized by the following: Females are more concerned and more willing to participate in environmental initiatives. Furthermore, Married people and large families are more concerned and more willing to participate in environmental initiatives and there is a positive correlation between education in terms of knowledge, behavior and attitude and between the environments but also there is a negative correlation between age and environmental concern.

2.5.12 Community Participation

Community participation is recognized as a factor contributing to the success of waste management. There have been many case studies in developing countries which prove that community participation in waste management plays a vital role in the contribution on the success of the services provided. Nevertheless, community participation is difficult to achieve even though it is important for solving the problem of waste management. There are several success factors that have been put forward by researchers that can practically encourage community participation in solid waste management. However, there are many disputes and disagreements on the selection of the best factors to ensure successful participation from the community in solid waste management. Therefore, this paper will assess the participation of the community in the improvement of solid waste management in Lindi municipality (Shukor, *et al.,* 2011).

2.6 Empirical Review

Kamara (2009) conducted a study on household participation in domestic waste disposal and recycling in the Tshwane Metropolitan area: An environmental education perspective. The study confirmed that, the main factors of household participation on domestic solid waste management are socio-economic factors (income and education

level) and institutional factors. It had shown that the wealthier people in the study are participating in domestic SWM than the poor people. Also educational level has a positive relationship with people's participation on household solid waste management.

However low level of awareness on environmental implication of proper waste management and low level of household coverage with the provision of waste management facilities, were other major factors related to institutional factors. The study suggested to increase the outreach of awareness creation on household sides, particularly the positive implication of proper solid waste management and the institution, again, should provide adequate facilities for proper waste management. The situation that prevails at Tshwane Metropolitan area may differ from the current study area in terms of attitude of people and cultural aspect.

Poswa (2004) carried out a study on the importance of gender in waste management planning: a challenge for solid waste managers. The aim of the study was to contribute some issues for the improvement of solid waste management services to the residents in developing communities.

The study found that women in most homes in the middle and low socio-economic status suburbs in the study area were more active in the enquiry it was justified as indicating their active role in family affairs including waste handling in their respective homes.

The study concluded that, there were great differences between men and women on the choice of type of waste collection service system. Women preferred a door to door

waste collection system while men choose a drop off centre. These differences can be attributed to the cultural traditions, which govern gender relations in the households. These difference shown may show the different trends in relation to the cultural and income generating activities in regard to waste collection services.

A study by Mengistie and Baraki 2010, conducted on community based assessment on household management of waste and hygiene practices in Kersa Woreda, Eastern Ethiopia. The study revealed that, majority of the households (66%) disposed off their solid wastes in open dumps and 6.9% of the households had temporary storage for solid wastes. With regard to sex and solid waste management, the study indicated that, about 98.4% of the selected households revealed that the responsibility of waste management is left for women and girls. Moreover, the waste management status in the study area was highly related with the educational level of the households. The situation that was reveal could also prevail in the current study area, however the study will extend to investigate at what level the community are willing to pay for the improving the solid waste management in the study area.

Asrat, (2006) conducted a study on solid waste management: a case study of household solid waste management in arada sub-city, Addis Ababa, Ethiopia. The study revealed that even though household solid waste service is given to the population in the sub-city, the service is considered poor by the population due to institutional, socio-cultural and financial factors such as lack of adequate facilities for solid waste collection and disposal services, displeasure of the workers with incentives, unfair placement and improper use of waste containers, inadequate assignment of budget to the sector, illegal ways of disposing wastes, and insignificant participation of the community in the waste

management. The policy of waste management could address different approaches with the current study area.

Study conducted in Kampla on Determinants of Willingness to Pay for Solid Waste Management in Kampala City by Niringiye (2010). Reveal that respondents level of education, marital status, quantity of waste generated, household size and household expenditure do not significantly influence willingness to pay for improved waste management the results of this study suggest there is little chance of success if solid waste collection service charges are introduced. The study shows the difference trend on most of the determinants this could be on how the respondent perceives the concept of contributing for solid waste management.

According to Kibonde, (2014) study on Solid Waste Management in Dar es Salaam: Privatizing and Improving Revenue Collection, reveal that the collection of solid waste in Dar es Salaam has been hampered partly by poor infrastructure and equipment, management arrangements which have not adequately coordinated the interventions of the different actors before and after decentralization of the collection service, inefficient collection and management of the refuse collection charges, designing fault with solid waste collection point, lack of a proper landfill, among others. The results indicated that the majority of residents in the Municipality participated though involuntarily.

The residents in the study area were paying different amounts of cash as refuse collection charges to the private sector agents dealing with waste collection in their streets. It was further observed that the majority of the inhabitants were not complying with the charges due to various reasons such as charges being high, the poor perception

that it is the responsibility of the government to provide such a service free of charge. Not only, that but, the residents were not satisfied with the quality of services provided by the private agents especially in waste collection. the trend revel in Dar es Salaam could give different outcome take into consideration of the complexity of the city with compared to the current study area.

Jumanne, (2010) conducted a study on Community Participation in Municipal Solid Waste Management in Informal Settlements: Morogoro Municipality in Tanzania and reveal that Morogoro Municipality has not yet achieved effective Community Participation in Municipal Solid Waste Management due to lack of appropriate organization, mobilization and coordination of local resources; and community empowerment. Elites are rhetoric about Community Participation in Municipal Solid Waste Management for them still plan and act conventionally; some cannot enforce environmental laws due to corruption. Also the outdated and deficient environmental laws could not work efficiently in the current market economic situation.

Puopiel, (2010) studied on solid waste management in Ghana: the case of tamale metropolitan area. His research objective was to examine the factors of effective solid waste management in the metropolis and suggest possible measures to tackle the problem. Finding suggested that inadequate skip supply for storing wastes, lack of routine collection of wastes, poor methods of waste management and inadequate resources for waste management institutions to effectively collect the waste generated are the main factors that affect the effectiveness of solid waste management in the area. In other words, he found more of institutional factors.

According to Lauwo, (2005) revealed that community based organization could be an important institutions in facilitating the improvement of solid waste Management

service in Korogwe Town Council. Also community participation in formulating of waste management by - laws could help to improve solid waste disposal in the township. However the effective legislation and enforcement were found to be the best ways to incorporate the Community Based Organizations in the council solid waste management.

There is no fixed definition that can describe a clear meaning of community participation. This is because different researchers interpret the purpose of community participation with different views. The community participation concept has different meanings to different people to such an extent that virtually many community based project or programme that is now being a fashionable termed Community participation'. It is also known as citizen participation, people's participation, public participation, and popular participation. Shukor, (2011) defined community participation as a process by which communities act in response to public concerns, voice out their opinions about decision that affect them, and take responsibilities for changes to their community.

2.7 Research Gap

According to the review of literature of various studies in different places by different researchers various factors were investigated as the determinants for community to participate and willingness to pay for the solid waste management. However, given the different environment and situation of different cultural aspects, this study reveals the gape for community participation in the payment area. Therefore in this study will assess the community participation on solid waste management in Lindi Municipality Tanzania.

CHAPTER THREE

METHODS AND MATERIALS

3.1 Study Area

The study was conducted in Lindi Municipal Council at Lindi Region. The Municipality is one of the famous coastal towns along the coastal belt of the Indian Ocean in the country. The Municipality is situated at latitude 9º 45' and 10º45' south of the Equator. Longitude 39º50' and 39º36,' East of Greenwich. It is surrounded by Lindi district council at both sides except at the eastern side where there is an Indian ocean. Administratively, Lindi Municipal Council is divided into 3 divisions, 18 wards and 83 streets.

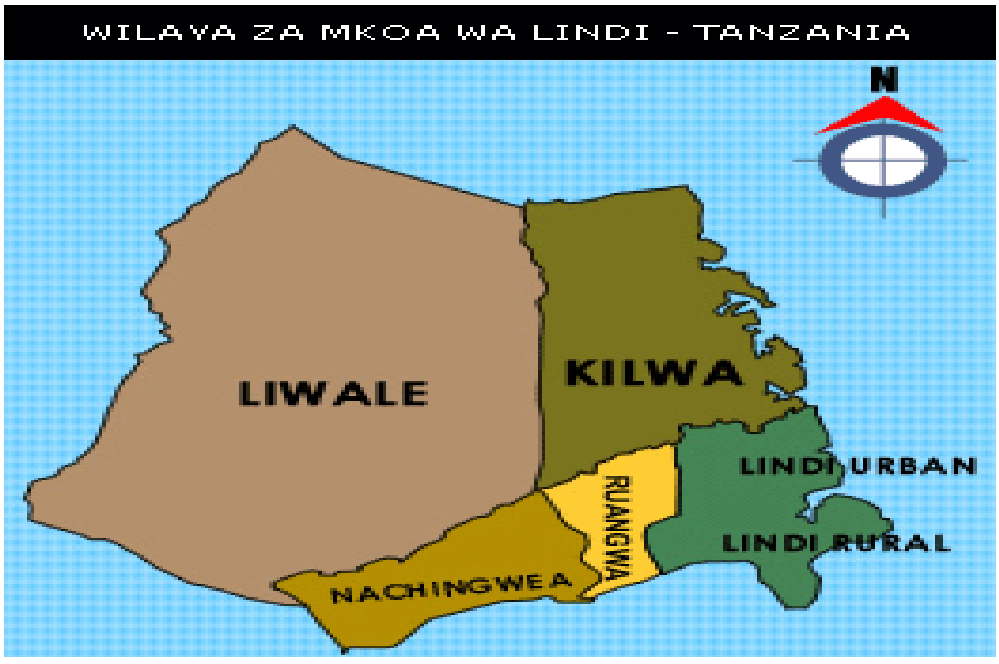

Figure 2. 2 A map of Lindi Region showing Administrative area Source: (http:/www.lindi.go.tz)

Source: Researcher Data, 2015

3.2 Demographic Data

National census results of 2012 showed that Lindi Municipal Council has total population of 78,841 people, where 41,316 are female and males are 37525 with growth rate of 1.4% (NBS, 2012). Currently total pollution is estimated to be 93,672.

3.3 Climatic Conditions

The Council experienced a hot and humid weather. The climate patterns in the area is characterized by a long dry spell from May to October followed by a period of rainfall from November to April, however the rainfall pattern is not uniform it has difference interruptions. The mean annual rainfall is 800 – 1000 mm with perennial high humidity. The average temperature is 24º C - 28º C while in December is the hottest month (Lindi Municipal Profile Report 2013).

3.4 Socio Economic Factors

The predominant tribes found in the area are the Mwera, Makonde, Yao and Makua. A small proportion of Asian and Arabs origin is also present. Few people are employed as civil servants, while the majorities are engaged in small –scale farming including livestock keeping, Fishing and patty cash business.

3.5 Sampling Procedure and Techniques

This study was employing both qualitative and quantitative approaches for the purpose of triangulation. The use of both quantitative and qualitative approaches were suitable because the study intended to capture participants' views regarding community

participation in solid waste management as part of validating quantitative data (Mugenda and Mugenda, 2003). Data was collected with questionnaires. And this method allowed the computation of variables, percentages, frequencies, correlation coefficient and at last drawing up the conclusion from the findings. The stratified random sampling was used to obtain respondent from the study area. A household was a sample unit. Sampling frame of the households was established with the help of ward executive officer.

3.6 Research Design

The descriptive cross-sectional survey was used in order to capture data from a relatively large number of different categories of respondents at a particular point in time. According to Mugenda and Mugenda (2003), this design is used when the study is aimed at collecting data from respondents without the need to make a follow up of the same respondents thus enabling the researcher to save time in collecting the necessary information. Data was collected using mainly interviews and questionnaire and analyzed using descriptive analysis. The questionnaire was the basic device in tapping participants' opinions. Both closed and open-ended items of the questionnaire were used so as to generate responses and data for analysis.

3.7 Sample Size

The sample size was 135 households drawn from three wards (Rahaleo, Mwenge and Mtanda). A household was be sample unit. A sampling frame of the household was established from the register of ward executive officer and street chair person. A sample of 5% was selected using random sampling. The respondent was selected from three categories that is low income, Middle and High income class according to their

settlement areas in those three wards. The income categories of the household were determined by key informers within the particular area.

Table 3. 1 Sampling frame

Ward	**No. Population**	**No. Household**	**No. household to be Selected(sample size)**
Rahaleo (Low income)	2111	596	30
Mwenge (middle income)	2808	806	40
Mtanda (high income)	5683	1524	65
Total Population	**10602**	**2926**	**135**

3.8 Target Population and Sampling

The target population of this study was community members such as head of the households and officials of the health department.

3.9 Stratified Random Sampling

A stratified random sampling was used to select household to participate in the study. Three strata were established according to wealth of the community that is low. Middle and high income which was determined according to area of residence.

3.10 Data Collection Methods

Both primary and secondary sources of data were collected. The primary sources included the respondents whereas the secondary sources are variety of published and

unpublished written materials. The multiple methods used in data collection (questionnaire, interview and document review) are described hereunder.

3.10.1 Interviews

Interviews allow the researcher access through words to an individual's constructed reality and interpretation of his or her own experience (Fontana & Frey, 2000). Interviews enabled the researcher to seek an understanding of participants' perspectives of their experiences with respect to solid waste management. Semi-structured interview was used to ensure that there was consistency in the collection process; the interviews were structured with fixed questions whose wording sequence was identical for every respondent.

3.10.2 Questionnaire

Questionnaire is a research instrument for collecting data and other information from the field of the study. It is an instrument which requires a careful and clear statement of the research problem underlying or being investigated by the questionnaire (Mugenda, and Mugenda, 2003). The administered questionnaires on community participation on solid waste management were provided to respondents from sampled households in Lindi Municipal. Closed-ended questions were used to collect data and other information from respondents in a short period.

3.10.3 Documentary review

Documentary review helped the researcher to get relevant information from the primary sources for the analysis of the study. The primary documents were obtained from the Municipal offices. These included quarterly and annual reports on Environmental

sanitation the information from these sources was used to determine the level of community participation on solid waste management.

The secondary sources reviewed were books, journals, unpublished dissertations, reports and written papers obtained from the library. Furthermore, other information on community participation on solid waste management.

3.11 Pilot Study

The pilot study was conducted in order to ensure that instruments are accurate. This pre-testing of research tools were done with the intention of checking the validity and reliability of the research instruments and the time taken to fill the questionnaire. The pre test of tool was conducted at Mitwero ward and a total of twenty (20) households were involved. The researches reveal that questionnaire was consistency; however correction was made to remove some of the repeated question.

3.12 Validity and Reliability of Research Instrument

Validity was intended to measure what the researcher aimed to measure while reliability looks on the consistency in measurement of the research instrument (Spector, 1997). Before analysis of this dataset, the dataset was cleaned and evaluated to determine its feasibility or validity for analysis. Validity and reliability of Likert scale questions was tested using Cronbach's Alpha which revealed a value of 0.76 indicating good internal consistence of the questions.

3.13 Data Analysis

The analysis of data was done according to the information gathered and edited by the researcher. The response of respondents were coded by using numbers in different questions and tabulation of data collected, processed into tables and charts for meaningful and easy interpretation (Kothari, 2004).

3.14 Quantitative Data Analysis

Data collected through questionnaire and documentary review on how community participates on solid waste management was entered and processed by using Statistical Packages for Social Sciences (SPSS, version 20). The data was summarized into tables, charts, frequencies, percentages and cross tabulation. In addition, Microsoft Excel programme was used for drawing some charts with multiple responses so as to simplify interpretation of the data so collected.

3.15 Qualitative Data Analysis

Qualitative analysis was done to provide the necessary explanations to the quantified data, and to share observations made through the interviews and documentary review. The interview data was subjected to content analysis. All responses were read and the main idea was extracted to obtain the core meaning (Cohen *at el*., 2000). Then the data was described and others presented in percentages and frequencies.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Results

This chapter presents and discusses the observed findings of the study for each of the research objectives in chapter one.

4.1.1 Profile of the Study Area and the Respondents

The study was conducted in Lindi Municipal Council and involved 3 Wards (Rahaleo, Mwenge and Mtanda) and 3 streets in the respective Wards. The distribution of the respondents was based on the heads of the households whereby 5% of the number of households in each Ward was included in the study. 135 respondents were selected purposively from three categories that were low, Middle and High income classes according to their settlement areas in those 3 Wards. Table 4.1 presents the distribution of the respondents by gender for each of the streets.

Table 4. 1 Distribution of the Respondents by gender in each Ward

		Gender		
Ward	**Street**	**Female**	**Male**	**Total (%)**
	Ufukoni	5	5	10 (7.4)
Rahaleo	Rahaleo	7	3	10 (7.4)
	Majengo	5	5	10 (7.4)
	Magogoni	6	7	13 (9.6)
Mwenge	Mwenge	10	3	13 (9.6)
	NHC	12	2	14 (10.4)
	Mtanda Juu	13	9	22 (16.3)
Mtanda	Mtanda Kati	10	12	22 (16.3)
	Mtanda karikooo	16	5	21 (15.6)
Total		**84**	**51**	**135**
%		**62.2**	**37.8**	**100**

Source: Researcher Data, 2015

Findings in Table 4.1 show that a total of 135 respondents participated in the study and among them 84 (62.2%) being females and 51 (37.8%) being males. Mtanda Kati and Mtanda Juu streets in Mtanda Ward had high number of the respondents 22 (16.3%), while both streets in Rahaleo Ward had few numbers of the respondents 10 (7.4%). Out of a total 84 female involved in the study, Mtanda Kariakoo had more number of female 16 (19%) while Mtanda Kati had more number of male 12 (23.5%) out of the total 51 males involved in the study. Ufukoni and Majengo streets in Rahaleo Ward had nearly the same number female 5 (6%) and male 5 (9.8%).

Generally, the findings in Table 4.1 shows that most of the respondents were from Mtanda Ward 65 (48%) and minority of the respondents were from Rahaleo Ward 30 (22%) as shown in Figure 4.1.

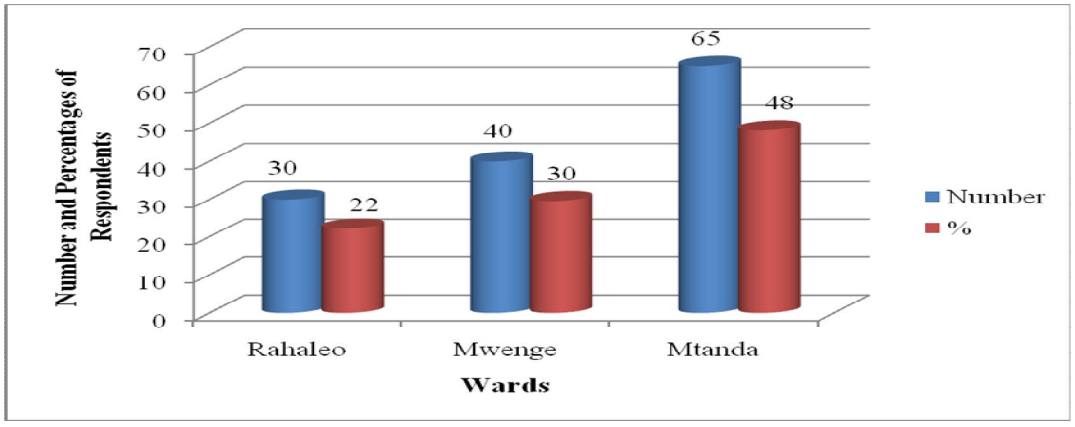

Figure 4. 1 Distribution of the respondents by Wards in cumulative form.
Source: Researcher Data, 2015

4.1.2 Demographic Characteristics of the Study Population

The demographic characteristic of the respondents in the study population was related to gender, age, and marital status, level of education, family size and years of stay in Lindi

Municipal Council. It was expected that such demographic variables could influence respondents to participate in the solid waste management.

4.1.2.1 Distribution of the Respondents by Age and Gender

The findings of the study indicated the gender of the respondents in relation with their age as Table 4.2.

Table 4. 2 Distribution of the respondents by age and gender

Age group	Gender Female (%)	Male (%)	Total (%)
20 – 25	9 (10,7)	5 (9.8)	14 (10.4)
26 – 30	9 (10.7)	10(19.6)	19 (14.1)
31 – 35	12 (14.3)	1 (2.0)	13 (9.6)
36 – 40	17 (20.2)	8 (15.7)	25 (18.5)
41 – 45	6 (7.1)	3 (5.9)	9 (6.7)
46 – 50	13 (15.5)	6 (11.8)	19 (14.1)
> 50	18 (21.4)	18 (35.3)	36 (26.7)
Total	**84 (100)**	**51 (100)**	**135 (100)**

Source: Researcher Data, 2015

Table 4.2 illustrates out of 135 respondents, 36 (26.7%) were from the age group above 50 years, while age group of 41 - 45 years had a few respondents 9 (6.7%). Out of 84 total female respondents, the age group of above 50 years had more respondents 18 (21.4) and followed by the age group of 36 – 40 years which had 17 (20.2%) respondents. Likewise, out of the 51 total males respondents in the same age group of above 50 years the number male respondents were more 18 (35.3%) followed by the age group of 26 – 30 which had 10 (19.6) respondents. The number of female's

respondents were almost twice in numbers in age group of 36 – 40 years, 41 – 45 years and 46 – 50 years while in the age group of 31 – 53 years the number of females were 12 times compared to that of the males. The age group of 41 – 45 years had a few number of respondents in both female 6 (7.1%) and male 3 (5.9%).

4.1.2.2 Distribution of the Respondents by Marital Status

The study shows the distribution of the respondents by marital status as one of the variable that might influence an individual to participate in payment for the improvement of solid waste management. Table 4.3 shows the distribution of respondents by marital status.

Table 4. 3 Distribution of the respondents by marital status

Marital status	**Total (%)**
Single	25 (18.5)
Married	92 (68.2)
Divorced	8 (5.9)
Separated	2 (1.5)
Widower	8 (5.9)
Total	**135 (100)**

Source: Researcher Data, 2015

Table 4.3 indicates high proportion of the respondents were married 92 (68.5), followed 25 (18.5%) which represents singles. In the group of divorced and widower indicates to have similar number of respondent that is 8 (5.9%). Further, the findings shows that separated group had few numbers of respondents by having only 2 (1.5%) respondents.

4.1.2.3 Distribution of the Respondents by Education Level

Education level was considered as among the variable to measure the level of willingness to pay for the improvement of solid waste management. Table 4.4 shows the findings of the respondents involved in the study.

Table 4. 4 Distribution of the respondents by education level

Education Level	Total (%)
No formal education	10 (7.4)
Primary education	78 (57.8)
Secondary education	32 (23.7)
Certificate	2 (1.5)
Diploma	7 (5.2)
Degree and above	6 (4.4)
Total	**135 (100)**

Source: Researcher Data, 2015

The findings in Table 4.4 revealed that majority of the respondents 78 (57.8%) had primary education level and followed by 32 (23.7%) respondents that had secondary education while 10 (7.4%) of respondents reported without education. Out of the total 135 respondents 6 (4.4%) had degree and above education level, 7 (5.25) had Ordinary diploma level of education while 2 (1.5%) had certificate educational level. Further, findings indicated that 125 (92.6%) of the respondents had formal education with the exception 10 (7.4%) respondents reported had no formal education.

4.1.2.4 Distribution of the Respondents by Family Size

Family size was one of the variables measured in the study, which was related to various factors that might influence the heads of the households to pay for solid waste management or otherwise. Table 4.5 narrates the findings.

Table 4. 5 Distribution of the respondents by family size

Family size	Total (%)
1 – 3	37 (27.4)
4 – 6	70 (51.9)
7 – 9	22 (16.3)
10 – 13	6 (4.4)
Total	**135 (100)**

Source: Researcher Data, 2015

Majority of the respondents 70 (51.9%) being in the family size ranging between 4 – 6 people, followed by 37 (27.4%) being in the family size ranging between 1 – 3 people. Few respondents 6 (4.4%) reported to belong in the family size ranging between 10 – 13 people. Generally, the findings revealed that 107 (79.3%) of the respondents being in the family size between 1 to 6 people per family, while 28 (20.7%) reported to belong in the family size ranging between 7 – 13 people per family.

4.1.2.5 Distribution of the Respondents by Duration of Stay in Lindi Municipal Council

Length of stay of the respondents was measured as one of the variable that might influence an individual to participate and pay for the improvement of solid waste management as in Table 4.6.

Table 4. 6 Distribution of the respondents by year of stay in Lindi municipal

Year of stay	Response (%)
– 3	16 (11.9)
4 – 7	12 (8.9)
8 – 11	9 (6.7)
12 – 15	11 (8.0)
16 – 19	9 (6.7)
> 20	78 (57.8)
Total	**135 (100)**

Source: Researcher Data, 2015

Table 4.6 indicates that Majority of respondents, 78 (57.8%) had more than 20 years time of stay in Lindi Municipal Council. 16 (11.9%) of the respondents had few years of stay that range between 1- 3 years. Generally, the total mean average time of stay for all respondents is 4.6 years.

4.1.3 Level of Satisfaction on Solid Waste Management

The level of satisfaction was measured in relation to service of solid waste management in Lindi Municipal Council. The respondents were asked to air out their opinion on the satisfaction for the services provided. Figure 4.2 illustrates the findings.

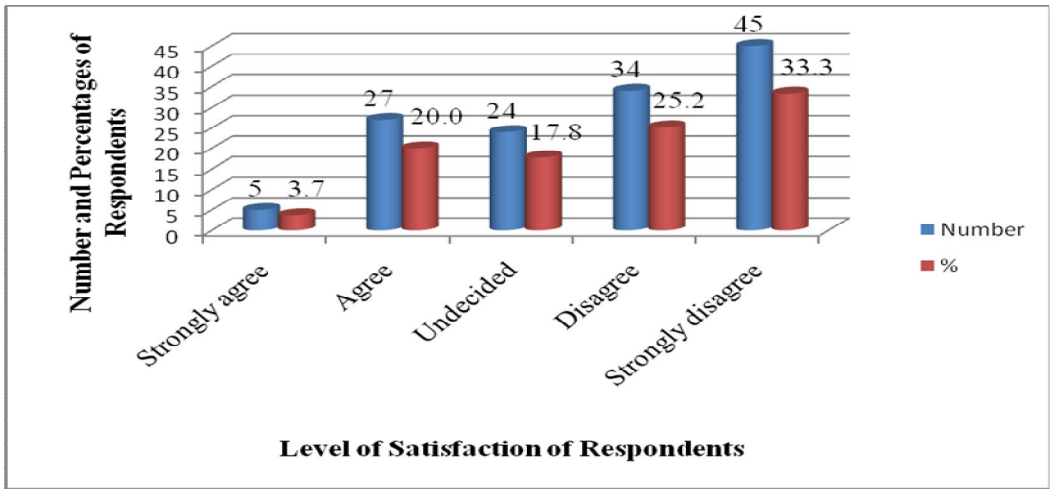

Figure 4. 2 Satisfaction with the waste management service provided by Lindi Municipal Council

Source: Researcher Data, 2015

Figure 4.2 indicates that, majority of the respondents 79 (59%) not satisfied with the services of solid waste management provided in Lindi Municipal Council. On the other hand 32 (23.7%) of the respondents were satisfied with the services of solid waste management provided. Out of 135 respondents, 24 (17.8) respondents were undecided, not either side of satisfied or dissatisfied.

4.1.4 Evaluation of the efforts to provide solid waste management services

Respondents were asked to evaluate on the different efforts made by the Lindi Municipal Council in an attempt to solve the problem of solid waste management in the Municipality and responses were as drawn in Figure 4.3.

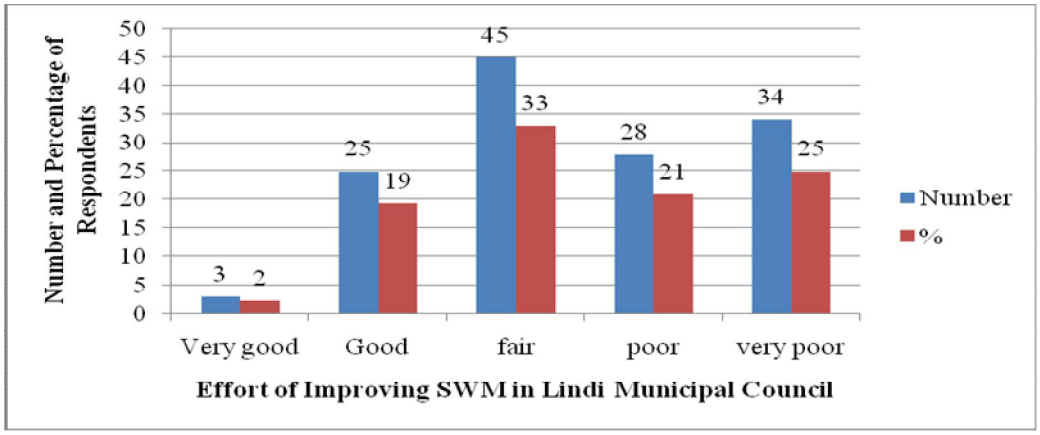

Figure 4. 3 Evaluation of the efforts to provide solid waste management services

Source: Researcher Data, 2015

The results indicated that 62 (46%) of respondents reported that the solid waste management service provided in Lindi Municipal Council is poor. While 45 (33%) of the respondents claimed that the effort to provide solid waste management in Lindi Municipal Council is fair. About 28 (21%) of respondents reported that the service provided is good.

4.1.5 Fairness of the penalty or breaching rules on solid waste management

The respondents were asked to evaluate the fairness of the penalty provided by Lindi Municipal Council authority in case of breaching rules and regulations on solid waste management. Figure 4.4 illustrates the findings.

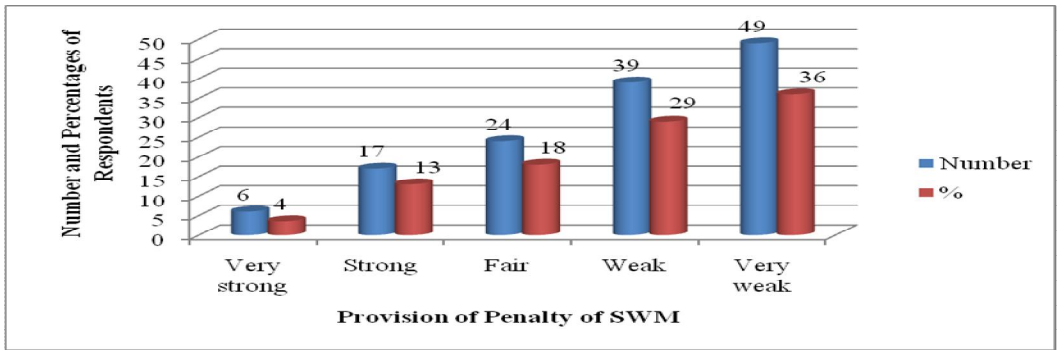

Figure 4. 4 Appropriateness of the penalty to prevent violators of solid waste management

Source: Researcher Data, 2015

Figure 4.4 shows that majority of participants 88 (65%) responded that the penalty given is very weak. About 24 (18%) of the respondents stated that penalties provided was fair. Another small group of respondents reported that the penalties provided were strong 23 (17%).

4.1.6 Waste separation practices at the household level

Different options of waste separation at the point of generation in household level were assessed to see whether it is practiced or otherwise. The findings are presented in Figure 4.5.

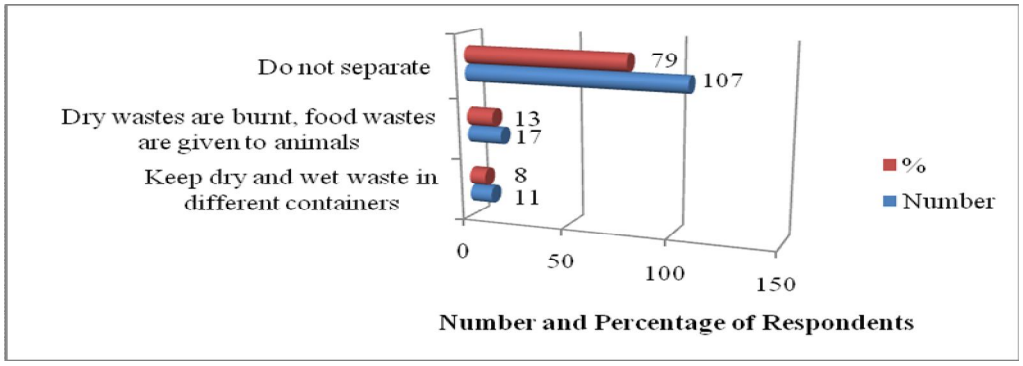

Figure 4. 5 Wastes separation practices at household level

Source: Researcher Data, 2015

Figure 4.5 indicates that majority of the respondents 107 (79%) reported that they do not separate the types of waste produced at the household level. There were 17 (13%) respondents that indicated they usually separate wastes by burning the dry wastes and giving food waste to their animals. About 11 (8%) of the respondents reported to practice separation by keeping dry and wet waste in different containers.

4.1.7 Knowledge and practice on solid waste management in Lindi Municipal Council

The study intended to assess the level of respondents in understanding and practice on different aspects related to solid waste management and the results are narrated in the Table 4.7

Findings in Table 4.7 indicated that when participants were asked whether they understand and have knowledge of solid waste management, most 57 (42%) responded that they understand well about solid waste management. In general the number of people who responded that they understand well/very well were 97 (72%) of the respondents showing that the population understand about solid waste management. About 107 (79%) of the participants responded that they do not practice waste separation at household level. However, when asked the reasons for not separating the waste majority 78 (58%) responded that they do not have knowledge of separation. Interestingly, majority of the participants 110 (81%) agreed that the amount of solid waste generated had direct link with their life style. About 91 (67%) of the respondents, said that there is no micro or macro enterprises that deal with solid waste collection in their areas. Majority of the interviewed respondents 127 (94%) claimed that the location of their houses are not barrier for waste collection services. Also majority 93 (69%) of

the participants said that they were aware on the presence of the rules and the regulations on solid waste management. Most 105 (78%) of the participants indicated that they had never seen violators of the rules and the regulations on solid waste management penalized.

Table 4. 7 Knowledge and practice on solid waste management in Lindi Municipal Council

Variables	Number	%
Understanding on solid waste management		
I understand very well	40	30
I Understand Well	57	42
I understand not well	29	21
I do not understand,	9	7
Whether household practice waste separation		
Yes	28	21
No	107	79
I do not know	0	0
Reasons if not practicing waste separation		
I do not have the understanding	78	58
I did not think as it is my responsibility	14	10
I did not visualize the importance	43	32
Knowing that solid waste generation is affected by oneself		
Yes	110	81
No	16	12
I do not know	9	7
Presence of micro and macro enterprises that collect solid wastes		
Yes	41	31
No	91	67
I do not know	3	2
Whether location of the house affects collection of wastes		
Yes	2	2
No	127	94
I do not know	6	4
Knowing presence of rules and regulations of solid wastes		
Yes	93	69
No	26	19
I do not know	16	12
Whether the Municipal enforce rules and regulations present		
None at all	18	13
Regulations are weak	79	59
Regulations are strong	9	7
I do not know	29	21
Violators of rules and regulations of solid waste management penalized		
Yes	18	13
No	105	78
I do not know	12	9

Source: Researcher Data, 2015

4.1.8 Community willingness to pay for waste collection services

The respondents in the study area were assessed on their willingness to pay to improve solid waste management and the responses were as in Figure 4.6.

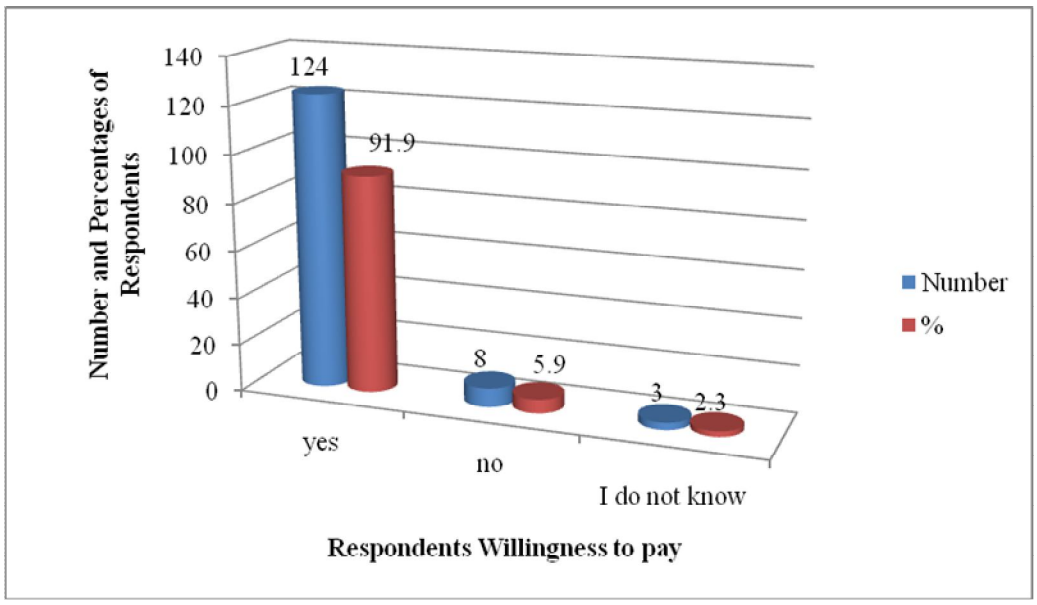

Figure 4. 6 Community willingness to pay for waste collection services

Source: Researcher Data, 2015

Figure 4.6 shows that majority of the participants 124 (92%) were actually willing to pay for the waste collection services. Only 8 (6%) respondents replied that they were not willing to pay for solid waste management services. Out of the total 135 interviewed respondents, there were 3 (2%) respondents reported that they do not know whether there are payments.

Furthermore, the willingness to pay were also assessed according to the cluster of the Wards established to see if there is a significant different in the willingness to pay and the findings were as in Table 4.8.

Table 4. 8 Willingness to pay according to the Wards

	Willingness to pay		
Ward	**Yes (%)**	**No(%)**	**Total (%)**
Rahaleo	28 (93.3)	2 (6.7)	30 (100)
Mwenge	36 (90.0)	4 (10.0)	40 (100)
Mtanda	60 (92.3)	5 (7.7)	65 (100)
Total (%)	**124 (91.9)**	**11 (8.1)**	**135 (100)**

Source: Researcher Data, 2015

Findings in Table 4.8 revealed that in Rahaleo Ward which was categorized as low income, 28 (93%) were willing to pay to improve solid waste services while 2 (7%) respondents were not willing to pay. In Mwenge Ward which was categorized as middle income about 36 (90%) respondents were willing to pay for the services and 4 (10%) were not willing to pay. Mtanda Ward which was categorized as high income, 60 (92%) of the respondents were willing to pay while 5 (8%) were not willing to pay.

Generally, the willingness to pay did not differ very much in both Wards. However, Mwenge Ward indicated to have the relatively high proportion of those who are not willing to pay by 10% followed by Mtanda Ward 8% and Rahaleo Ward had the lowest by 7%.

Additionally, willingness to pay was compared with respect to gender to see which gender is more willing to pay for the services than another. Table 4.9 shows the findings:

Table 4. 9 Willingness to pay according to gender

	Willingness to pay	
Gender	**Yes (%)**	**No (%)**
Female	79 (94)	5 (6)
Male	45 (88)	6(12)
Total (%)	**124 (91.9)**	**11 (8.1)**

Source: Researcher Data, 2015

Findings in Table 4.9 shows that out of 84 female respondents 79 (94%) were willing to pay for solid waste management services. On the other hand, out of 51 male respondents 45 (88%) were willing to pay for solid waste management services. Thus it implies that the female respondents were more willing to pay for solid waste management services in comparison to the male respondents.

4.1.8.1 Amount of money they are willing to pay

Findings from Figure 4.6 shows that 124 (92%) of the respondents were willing to pay for the improvement of solid waste management. The research was interested to know at what amount they would pay per month. Figure 4.7 indicates the findings:

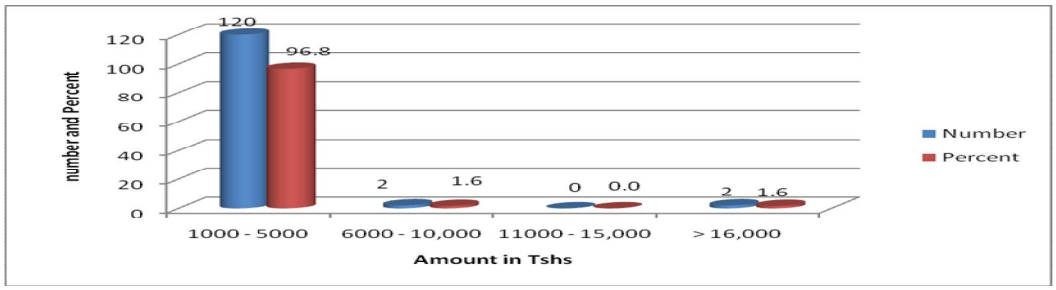

Figure 4. 7 Amount of money in Tshs willing to pay

Source: Researcher Data, 2015

Findings from Figure 4.7 revealed that majority of those who were willing to pay 120 (97%) could pay the amount of Tanzanian shillings 1000/= to 5000/= per month for solid waste services management. Very few 2 (1.6%) respondents reported to pay an amount ranging between Tanzania shillings 6000/= to 10, 000/= and above up to Tshs 16,000/=.

The willingness to pay were also analyzed in relation to the Wards of the respondents, Table 4.10 illustrates the trend:

Table 4. 10 Amount of money willing to pay per Wards

	Amount willing to pay per month in Tanzania shillings			
Ward	**1000 - 5000**	**6000 - 10,000**	**> 16,000**	**Total**
Rahaleo	28 (100%)	0	0	00%)
Mwenge	36 (100%)	0	0	36 (100%)
Mtanda	56 (93.4%)	2 (3.3%)	2 (3.3%)	60 (100%)
Total	**120 (96.8%)**	**2 (1.6%)**	**2 (1.6%)**	**124 (100%)**

Source: Researcher Data, 2015

Findings from Table 4.10 indicates that 4 (3.2%) of the respondents in Mtanda Ward were willing to pay more than Tshs 5000/= than the other two Wards. In generally, majority 120 (97%) of the respondents in both Wards were willing to pay Tshs 1,000/= to 5,000/=.

4.1.9 Community perceptions on solid waste management

As the part of assessing knowledge in relation to solid waste management, the respondents were asked to air out their different opinions on the aspect of solid waste management in Lindi Municipal Council. Table 4.11 shows the results.

Table 4. 11 Opinion of different aspects of solid waste management in Lindi Municipal Council

Questions	Number	Response	%
Knowledge on public health problems associated with poor solid waste management	135	95	70
Municipal Council has the capacity of providing solid waste management services	135	37	27
It is possible for the community to pay for solid waste management services	135	63	47
Laws and regulations for solid waste management are real imposed to those who do not act in accordance with	135	56	41
Community is well educated and informed on solid waste management in their respective areas	135	40	30

Source: Researcher Data, 2015

Findings in Table 4.11 indicated that majority of the participants 95 (70%) strongly agreed that they know about public health problems which are associated with the poor solid waste management. Out of total 135 respondents there were 37 (27%) respondents who agreed that Municipal Council can provide solid waste management services.

About 63 (47%) of the respondents agreed that it is possible for the community to pay for solid waste management services. Less than half of the respondents 56 (41%) indicated that the laws and regulations on solid waste management were imposed to those who do not act in accordance. Only 40 (30%) of the participants indicated that the community is well educated and informed about solid waste management in their respective areas.

4.1.10 Average solid wastes that a household generate per month

The research was interested to assess the average solid waste mostly generated per month and the responses are indicated in Table 4.12.

Table 4. 12 Solid wastes mostly generated per month

Wastes	Level	Number	%
Ashes	High	52	39
Food wastes	High	28	21
Woods	Very small	40	30
Grasses and leaves	High	35	26
Papers	Very small	30	22
Bones	Very small	63	47
Metals	Very small	62	46
Plastic/textiles	High	40	30

Source: Researcher Data, 2015

The findings in Table 4.12 shows that solid waste reported as high generated in household per month was ashes (39%), plastic or textile wastes (30%), grasses/leaves (26%) and food wastes (21%). Conversely, very small solid wastes that household generated per month was Bones (47%), metal (46%), woods (30%) and papers (22%).

4.1.11 Reasons for not getting waste collection services

Participants were asked to give the various reasons for not getting waste collection to their location. Table 4.13 shows the findings.

Table 4. 13 Reasons for not getting waste collection services

Reasons	Number	Percentage
No waste collection service available	49	36
No motivation/payment to waste collectors	35	26
I don't know	12	9
Poor council management of the wastes	21	15
The area is still under development	5	4
Poor equipment for waste collection	13	10

Source: Researcher Data, 2015

Findings from Table 4.13 revealed that there were 49 (36%) respondents reported that the absence of waste collection services in their areas was the main reason for them not getting solid waste collected. About 35 (26%) of the participants responded that lack of motivation to waste collectors was one of the reasons. There were 21 (15%) respondents who said that poor Municipal Council coordination on waste management was an obstacle for waste collection services to their areas. Another 13 (10%) respondents reported that poor equipments for waste collection were the reasons. Only 12 (9%) of the participants responded that they don't know and 5 (4%) of respondents

pointed out the area of their residence is still under developed that is the reason of not getting services of solid waste collection.

4.1.12 Options of solid waste disposal at household level

Different options of household solid waste disposal was assessed to see disposal practices of the generated waste at household level incase there were no Municipal Council truck or waste collectors did not go at the right time. Table 4.14 shows the findings.

Table 4. 14 Options of solid waste disposal at household level

Questions	Number	Response	%
Keep the waste at home until the collectors go and use other storage materials	135	52	39
Burn it in the back of their home	135	35	26
Dump waste on open space, which is far from the main roads	135	47	35
Dump waste in sewerage systems	135	63	47
Dump waste at the sea shores	135	66	49
Dig a hole around houses and burn them	135	44	33

Source: Researcher Data, 2015

The findings in Table 4.14 revealed that out of total interviewed 52 (39%) participants reported to keep the waste at home until the collectors arrive. About 35 (26%)

respondents reported that they actually burn the solid wastes at the back of their homes. A fair number 47 (35%) of the respondents do not dump their waste in the open space far from main roads. A good number 63 (47%) of the respondents do not throw waste in sewerage systems while, 66 (49%) respondents do not dump waste at sea shores and 44 (33%) mentioned to dig holes around their houses and burn the solid waste.

4.1.13 The responsibility of waste disposal at community level

When participants were asked whom they think is responsible for solid waste management in Lindi Municipal Council, the responds as follows in Figure 4.8.

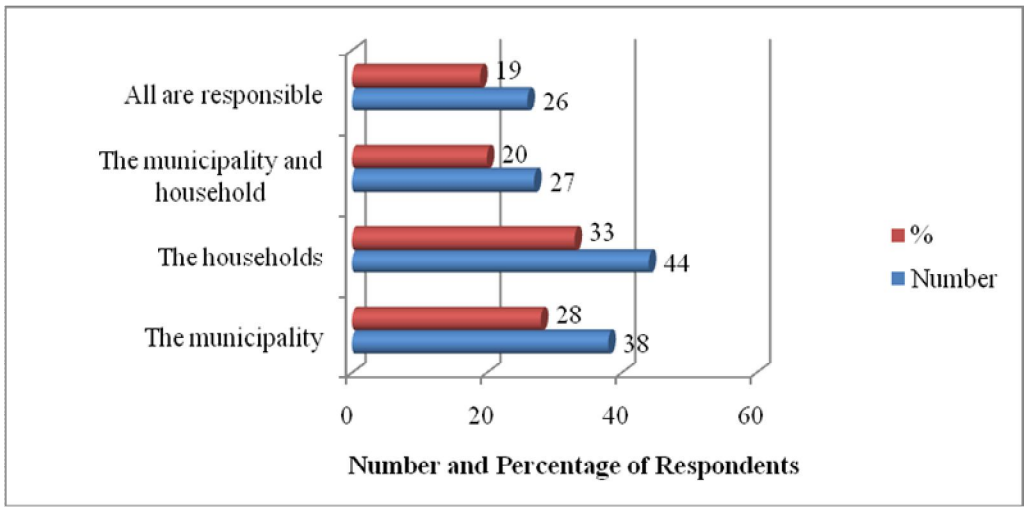

Figure 4. 8 Responsibility of waste disposal at Community level

Source: Researcher Data, 2015

Figure 4.8 indicated that a fair number of the respondents 44 (33%) said that the household members were responsible for solid waste disposal in Lindi Municipal Council. Only 38 (28%) responded that Municipal Council is the responsible body for solid waste disposal in Lind Region. A number of 27 (20%) respondents said that Municipal Council and Households are all responsible for solid waste disposal while 26

(19%) responded that all stakeholders are responsible for solid waste disposal in their particular areas.

4.1.14 Motive factors for willingness to pay for waste management services

The motive factors that influence the household member's willingness to pay for improved solid waste management services were assessed and the findings are as in Table 4.15.

Table 4. 15 Motive factors for willingness to pay for waste management services

Motive factors	Number	Proportion
Ability to pay	20	15
Making the environment clean	87	64
Prevent infectious diseases	15	11
Because of the law and regulations enforcement	4	3
In order to have chance for other activities	9	7

Source: Researcher Data, 2015

The findings in Table 4.15 shows that majority of the participants 87 (64%) reported that the motive factors to pay for solid waste management services were for them to make their environment clean. There were 20 (15%) participants reported that the motive factors to pay was because they have the ability to pay. About 15 (11%) of the respondents reported that motive factors to pay for the services was in order to prevent

the spread of the infectious diseases while very few respondents 4 (3%) like to pay for solid waste management service because of the enforcement of the law and the regulations

4.2 Discussion

The findings in Table 4.1 revealed that the number of female respondents 84 (62.2%) were higher compared to that of males 51 (37.8%) out of total respondents involved in the study on solid waste management in Lindi Municipal Council Tanzania. Same trend were observed in the study conducted in Durban South Africa on the importance of gender in waste management planning (Poswa, 2004). The findings from Durban study indicated that women in most homes of the middle and low socio-economic status were more active in their roles in family affairs including waste handling. Findings from Mengistie and Baraki (2010) in Kersa Woreda eastern Ethiopia indicated that 98.4% responsibility of waste management was left to women and the girls. Lindi Region in Tanzania is among the Regions which the indigenous people believe in matrilineal practice. This might contribute to some extent males to become less active in some issue related to household affairs including handling of waste management.

Findings in Table 4.3 illustrated that majority of the respondents were married 92 (68.5%) and hence are expected to be more willing to participate and pay for the solid waste management than other groups. It is assumed that the husband and the wife would help each other to make sure that their children and their surroundings are kept clean and free from unpleasant conditions due to solid wastes. The study conducted in Kampala Uganda (Okot *et al.* 2012) on households willingness to pay for improve Municipal solid waste management services revealed the same that married people are

likely to be more responsible to keep the environment clean that provide them with higher probability to pay for the improvement of solid waste management. On the other hand, those who are separated, widower and divorced are expected to have low probability to pay for the solid waste management due to various socio economic reasons, although this is not always the same but different scenarios might happen depending the situation and individuals.

The findings in Table 4.4 revealed that majority of the respondents had formal education that means primary to degree education levels. This illustrate that there is higher probability for the respondents to be more responsible and committed in the solid waste management. The expectation is that with this level of majority having formal education the level of understanding of the respondents on the consequences of unsanitary disposal of solid waste is expected to be high. This provide chances for the individual to have a formal choice to participate and pay for solid waste management service. Niringiye (2010) hypothesized that the higher the level of education the more people would appreciate the consequences of miss handling of solid waste and hence make formal choice to avoid risk of being a victim of unclean environment. The study conducted in Uganda on households' willingness to pay for improved Municipal solid waste in Kampala City revealed the same that household respondents who had attained secondary, post-secondary and graduate level of education were more willing to pay for improved solid waste management. (Okot, *et al.,* 2012).

The findings in Table 4.5 show the family size of the respondents in the study area. Family size revealed that majority of the respondents being in a range of 1 – 6 people. This is related to the number of individuals in the household who have direct

relationship with waste generation but also the number of individuals who might affect positively or negatively towards willingness to pay for the improved solid waste management services. However, households with big family size are expected to have high probability of waste generation and also had more children/people to take care. The study by Niringiye (2010) indicated that the more number of people in the household the more waste generation hence disposal become problem, thus they are more willing to pay in order to keep a clean environment. This also might happen in Lindi Municipal Council if the authorities may organize an appropriate mechanism for involvement of the community to pay for solid waste management services considering majority of the respondents 107 (97.3%) had a family size ranging between 1 - 6 people per family. The lowest family size had 1 – 3 people 37 (27.4%) while the highest family size had 10 – 13 people 6 (4.4%).

According to the findings in Table 4.6, on the time of stay in Lindi Municipal Council majority of the respondents 78 (57.8%) had more than 20 years duration of stay in Lindi Region, and the mean average of stay was almost 5 years, it means the respondents were not new in the place of residence. Thus it was expected that they have a wide chance of understanding the problems of solid waste management in their respective areas of residence, hence these could provide high probability of willingness to pay for solid waste management.

It was reveal that more than half of the total respondents 79 (58.5%) were not satisfied with solid waste services provided by Lindi Municipal Council in Figure 4.2, while 32 (23.7%) were satisfied with the services of solid waste management in Lindi. However, 24 (17.8%) of the respondents were neither satisfied nor dissatisfied with the services

provided. With more number of the respondents who are not satisfied, this implies that the situation of solid waste management in Lindi Municipal Council is in uncertainty state. This is in consistent with the study conducted in Urban Accra Ghana that 62% of the households were not satisfied with solid waste management services, (Yoada, *et al.,* 2014).

The study conducted on solid waste management in Dar es Salaam, Privatizing and Improve revenue collection by International Ocean Institute (2009), revealed the same trend that residents were not satisfied with the quality of the services provided by the private agents. The major reasons pointed out included poor infrastructure and equipments arrangement were not adequately coordinated.

A study conducted in Morongoro Municipal Council by Jumanne (2010), on community participation in Municipal solid waste management in informal settlement, revealed that they failed to achieve an effective community participation in solid waste management due lack of the appropriate organization, mobilization and coordination of local resource including community empowerment. The situation that prevailed in Morogoro may also exist in Lindi Municipal Council if there are no appropriate organization, mobilization and coordination in dealing with solid waste management.

According to Lauwo (2005) revealed that Community Based Organization (CBOs) are important tools for facilitating the improvement of solid waste management and effective enforcement of legislation is the best ways of incorporate community organization in solid waste management. This indicates that if community is full involved and participate in the solid waste management with the firmly enforcement of

legislation it is excepted that even the level of satisfaction of the community on solid waste management may become higher. This may cause everybody to evidence the efforts and indicate ownership created by community members towards solid waste management services.

When comparing the findings on satisfaction level on waste management services and the efforts made so far on solid waste management in Figure 4.3, it was revealed that 73 (54%) of the total respondents involved in the study said the satisfaction was in the level of very good, good and fair. Despite of the higher level of appreciation by the respondents, still the proportion of those who were not appreciating the efforts 62 (46%) made by Municipal Council in solid waste management were relatively higher, revealed as poor and very poor. Generally, the situation indicated the Municipal Council is far behind in the efforts made and planned in solving solid waste management in such that the community could appreciate and see the impact of the interventions of solid waste management.

Majority of the respondents 88 (65%) in reported to urge that penalties imposed to enhance solid waste management are weak/very weak. On the other hand, the negative adverse impact associated with solid waste assumed by the community versus value of money one might pay in case of breaching solid waste management rules and regulations do not correlate. Furthermore, is not the issue whether the penalties provided is strong or weak, but the presence of these rules and regulations including the by-law is one step, while the main challenges which face most of the Councils is how, who and when to enforce by-laws.

Lauwo (2015) in the study conducted in Korongwe Town Council –Tanzania indicated that by-laws could help to improve solid waste disposal in townships. He further suggested the effective enforcement of legislations were found to be the best way of incorporate community on solid waste management.

Information gathered from Environmental Department of Lindi Municipal Council revealed that there were no proper arrangement and coordination of the enforcement of the by-law and the other existing environmental regulations to the violators. There is a need to strengthen the coordination to institute appropriate arrangement and mobilization of local resources including the enforcement of the existing rules and regulations of solid waste management for improvement in Municipal Councils.

The findings in Figure 4.5 shows that majority of the respondents 107 (79%) do not practice waste separation at the household level. Despite the fact that the remaining respondents 17 (13%) and 11 (8%) reported to practice separation in different approaches, but during observation it was revealed that actually there are no differences from those who do not separate at all. This is very common to most of the households in Africa as reflected in other studies in African cities, (Peter, 2002). The situation creates favorable environments for vermin and vectors to breed hence pose threat to the public health. However, most of the respondents 78 (58%) in Table 4.7 urged that they do not have knowledge of solid waste separation while 43 (32%) do not visualize importance of separation of waste.

The higher level of respondents 97 (72%) recorded to be aware and understand the issue of solid waste management. This level of knowledge does not correspond to the real

situation prevailing in Lindi Municipal Council ground level. The study conducted in the Urban Accra Ghana, (Yoad *et al.* 2014) indicated the same trend. There is a need to continue and strengthen education on solid waste management with the intention of changing the behavior of individuals towards solid waste management. These findings might reflect the poor attitudes and lack of concerns regarding environment cleanness issues and the spread of the disease pathogens and pests.

Despite that majority of the respondents 110 (81%) in Table 4.7 agreed that the amount of waste generated in their household has the direct link to their life styles, still there was very little effort made to ensure sanitary disposal of the solid waste generated. The prevailing situation is the major constrains to the community willingness to implement the sound environmental management practices. It is high time for the Municipal authority to implement and enforce waste management rules and regulations, strengthen the community participation in solid waste management to alleviate the trend, (Jumanne, 2010).

Although, 93 (69%) in Table 4.7 of respondents reported that they were awere aware on the existing rules and regulations of solid waste management, still there was 105 (78%) who had never seen the breach of the rules and the regulations of solid waste management being penalized, thus there is low enforcements. Furthermore, 76 (59%) of respondents reported that the regulations are weak and only 9 (7%) said that regulations are strong. About 18 (13%) responded that Municipal Council do not apply the existing regulations at all, while 29 (21%) said that they are not aware if the Municipal Council impose the regulations to those violators. (Mniwasa & Shari, 2001).

Information gathered from Lindi Environmental Department indicated that for those violators, the penalty is Tshs 50,000/= according to Lindi Municipal Council by-Law. The concern of interest is how this by-law is enforced to the violators of solid waste management. This reveals that there is lack of appropriate organization, mobilization and coordination in solid waste management is the major constraint and hence poor enforcement of the existing by-laws.

Most of the respondents 91 (67%) in Table 4.7 urged that there are no micro or macro enterprises that collect solid waste at the homes, while 41 (34%) reported that there were micro or macro enterprises that collect solid waste. The research findings show that there is little involvement of the Community Based Organizations (CBOs) in the solid waste management. This is another area which needs more investigation to look upon the roles and responsibilities of the CBOs on solid waste management in Lindi Municipal Council. The study conducted in Khulna city Bangladesh indicated that 9 to 12% of total generated wastes were collected by door to door collection system provided by Non Governmental Organizations (NGOs) and CBOs using non motorized van and it shows significance improves of Municipal solid waste management, (Ahsan, *et al.,*2012). The importance of private sectors to participate in solid waste management is well stipulated in the Millennium Development Goals (Yoada *et al.,* 2014). Respondents were asked whether location of their house is the barrier to facilitate waste collection. Out of the interviewee 127 (94%) in Table 4.7 of the respondents said that the location of their houses do not hamper the collection of the solid waste from their premises.

The study findings in Figure 4.6 revealed that majority of the respondents 124 (91.9%) were willing to pay for solid waste management services. Yoada *et al.* (2014) indicated that more of the community members would be willing to pay when better waste disposal management practices are employed. This situation provide evidence that even in Lindi Municipal Council community are anticipated to participate to improve solid waste services if the Municipal Council authority institute a well functioning mechanism which is appropriate and affordable. It was observed that the willingness to pay does not differ very significant in all wards in spite of the wealth and income categories.

The willingness to pay was compared between gender and trend revealed that out the 84 females interviewed 74 (94%) and out of 51 males interviewed 45 (88%) were willing to pay for the service respectively. Data shows that females are more willing to pay by 6% compared to males this reflect many other studies which support that female have more positive influence to pay than males, (Afroz *at el.* 2009), Addai and Danson-Abbeam, (2014).

Furthermore, few respondents from Mtanda Ward 4 (3.2%) who are well off were willing to pay from Tshs 6000/= and above Tshs 16,000/= compared to the rest of the respondents of Mwenge and Rahaleo Wards.

A study conducted in Accra Ghana revealed that households were not satisfied with solid waste management services in the community due to irregular pattern in waste collection and high costs of contracting the private collectors. It further indicated that the community was willing to pay more when better waste disposal practices were

employed (Yoad, *et al.,* 2014). This implies that the community members were willing to pay the costs subjecte to the service provided.

Regarding public health related problems associated with unsanitary solid waste management, the findings revealed that majority of the respondents 95 (70%) were aware on the public health problems related poor solid waste management. They were even aware that improper solid waste management might lead to diseases such as cholera, typhoid, intestinal worms and diarrhoea, which account among the top ten diseases in our hospitals. These findings reflect that education level increase awareness on solid waste management hence has the positive relationship to willingness to pay (Kamara, 2009). However, the recordable level of understanding in the study area does not correspond to the observed practices as there are evidences of heaps of solid waste abandon on road side, street drains and even in open spaces through observation. The findings are in consistent to Kampala city study that revealed that the level of understanding does not have direct influence on the willingness to pay for improvement waste management (Niringiye, 2010).

More efforts are desired to be established by Municipal authority to ensure that levels of understanding negative adverse impacts on poor solid waste management showed by respondents are used as milestone for the changing mindset of community toward positive practices of solid waste management. This would assist in the reduced and even eliminate the growing mindset that government has sole responsibility to provide solid waste management services, (Jumanne, 2010).

Further findings from Table 4.11 show that very few respondents 37 (27%) perceived that Municipal Council has the capacity of providing solid waste management services

to the satisfaction level of the community. It was found that 63 (47%) which is almost half of total respondents were willing for the community to pay for solid waste management services. Similarly, a study conducted in Khulna, Bangladesh, recorded that people perceived that city authority has the responsibility of providing nuisance free habitats as they pay taxes. Obviously, community would appreciate and be more willing to pay for the services when they observe the positive impact of the services with the respect of their taxes. A recently study in Accra Ghana (Yoada *et al.,* 2014) shows that the community would be willing to pay more when better disposal practices are employed.

Less than half of all respondents 56 (41%) agreed that the law and the regulations on solid waste management are imposed to violators. This finding implies that enforcement of the law and the regulations is weak. It was expected to observe high awareness among community on solid waste management regulations, the law and the by-laws imposed to the violators. Strictly use of the exiting by-law regarding solid waste management would help in improving solid waste practice, (Lauwo, 2005). Information gathered from Lindi Environmental department, indicated that the Municipal Council has the by-Laws in place, although the challenges remain in the strict enforcement. It was further, explained from the department that there is a conflict of interest of political issues in certain circumstances that has being an obstacle in the enforcement of the by-Laws in the Municipal Council. However, the findings show that only 40 (30%) of the respondents said that the community is well educated and informed on solid waste management, that means education and information was not imported to the remaining 70% of the respondents. This might portray that solid waste management education is rearely provided. While in urban Accra Ghana study indicated that 53.6% of the

respondents had education on solid waste management (Yoada *et al.,* 2014). This signifies that solid waste management is given low priority in terms of education by the Municipal Council authorities. Attention is normally taken by the policy makers when a mass of people die through the outbreak of unsanitary related diseases such as cholera.

The findings in Table 4.12 indicated that ashes were more produced (39%) which reflects firewood and charcoal were mostly used as the sources of fuel at the household level involved in this study. This is reflected on issues of environmental and forests degradation due to massive cutting of trees for charcoal production and firewood as source of power. Plastics type of waste rank second by 30%, grass and food waste by 26% and 21% respectively. These findings differ relatively from the study conducted in Urban Accra Ghana which shows that waste generated in high amount was food debris (93%), plastics (64%), papers (47%) and clothes (21%) respectively.

Plastic waste generation is increasing as it is fashionable package replaced other form of packaging and these have likely implication on the disposal since plastics are not biodegradable. The situation supports the finding that plastic waste generation is increasing in Africa cities, (Achankeng, 2003).

Further, the finding in Table 4.13 indicates that 46 (36%) of respondents claimed that there were no waste collectors to their areas, which might reflect the truth. It is indicated that household head refuses to pay waste collectors for services provided because they did not get satisfied due to irregular schedules of collection hence made them to find another alternatives (Personal communication in this study). Very challenging issue on solid waste collectors is motivation as 35 (26%) of respondents mentioned the lack of

motivation. It was observed almost available waste collectors do not have protective gears and proper equipments for handling waste as indicated in the findings of about 13 (10%) of respondents.

Another reason which hinders the service was mentioned to be poor council management 21 (15%). Studies conducted in Dar es Salaam, (International Ocean Institute, 2009), Morogoro Municipal Council (Jumanne, 2010) both indicated that lack of proper organization, coordination and management arrangement contribute to failure in achieving solid waste management services.

The observed situation that happened Dar es Salaam and Morogoro by then could be the same in Lindi Municipal Council.

Although findings in Table 4.14 shows the respondents do not throw waste in sea shores (49%), sewerage system (47%) and in open space (35%) respectively but these findings do not reflect the real situation in the ground. Observation indicated that there are evidence of heaps of wastes indiscriminately dumped in the open spaces, road sides and even backyard of houses. This is in consistent to 1960s philosophy of disposal practices which was governed by thinking "out of sight out of mind" (Yoada *et al.,* 2014). These findings implied that indiscriminately disposal of wastes are existing that provide a favorable environment for the breading of vermin and vectors responsible for the transmission of diseases such as cholera, diarrhea, trachoma and other environmental sanitation related illness, (Achankeng, 2003).

Further, the study findings in figure 4.8 show that there are sense of sharing responsibilities hence 46 (39%) reported that the responsibilities belong to all

stakeholders both Municipal Council and the households. Another respondents 44 (33%) indicated households members are responsible for solid waste management. This maintains the policy statement that environmental management must be everybody's responsibility (NEP, 1997).

The findings revealed that the perceptions that the Municipal Council has the sole responsibility for solid waste management still account 38 (28%). The study conducted in Dar es Salaam (International Ocean Institute, 2009) and Urban Accra Ghana study (Yoada, *et al*. 2014) show similar notions that dwellers perceived government has the responsibility to provide solid waste services free of charge. However, few respondents 27 (20%) reported that both Municipal Council and households members have the responsibilities which concur with those reported all stockholder are responsible 26 (19%).

Further findings in the study in Table 4.15 indicated that majority of the respondents need clean environment, that is why more than half of the respondents 87 (64%) reported that their motive behind for willing to pay for the services is to make the environment clean. The incomes of the individuals were mention as a motive factor as well and the findings revealed some community members (15%) do pay because they have the capacity. The individual earnings were not assessed in relation to the factors influencing willingness to pay for service in this study. In other hand study conducted in Dar es Salaam by Kibonde (2014) revealed that community were complying with solid waste collection charges as it has being high and also the poor perception that government has the responsibility to provide services of solid waste management free of charge. However, study conducted in Kampala City by Niringiye (2010) suggested that

there is little chance of success if solid waste collection service charges are introduced. The results reveled in Kampla City study might shows different feeling on how the respondents perceive the concept of contributing for solid waste management in Lindi Municipal Council setting.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The success in solid waste management in Municipal Councils require collaborative approaches of communities, NGOs, CBOs, Private institution and Government in order to achieve the satisfaction level of solid waste management and make clean environment. The main objective of this study was to investigate the factors affecting community participation in solid waste management in Lindi Municipal Council Tanzania. It was important to investigate factors that might impacted the effort of solid waste management with an intent of improving the situation and reduce the public health and environmental threat associated with poor solid waste management.

The first objective of the study was to identify the determinants of household s willingness to pay improved solid waste management services. The results of the study found that majority (92%) of household members are willing to pay for solid waste management services provided that solid waste management services are carryout at level that community could appreciate the positive impact of the services, currently the study findings shows satisfaction of (24%) only. Despite of the high proportion (70%) knowledge on public health problems associated with poor solid waste management still there are need for intensive effort to educate the community in broad perspective of the negative adverse impacts of the indiscriminate disposal of solid waste by the Municipal Council authorities. There is very low (30%) coverage of solid waste management education to community in particular on how to disposal waste generated at household level in hygienic manner which increase risks of public health and environmental problems.

Perceptions of different wealth categories in relation to willingness to pay for solid waste management services in Lindi Municipal Council does not show considerable different as majority (97%) of the respondents from both wards included in the study had the same preference of payment for solid waste management. Female gender were more willing to pay by (94%) in comparison with male by (88%). Same perceptions for depending on the government as the sole entity responsible for solid waste management counted (28%).

Second objective was to determine the motive factors for the community to participate on solid waste management. The findings of the study indicated that the level of satisfaction to services provided, enforcement of laws including the impose of penalties and different perceptions of the community in relation to solid waste management as the determinant factors that influence someone to pay for the services. Lack of enforcement of solid waste management laws and by-laws encourage indiscriminate solid waste disposal. Despite the Municipal Council to have Solid waste management by –laws in place, there is no effective enforcement (41%) which contribute to inefficiency implementation of solid waste management services and hence community members continue with solid waste malpractices. Regardless of the effort made in the improvement of solid waste management, it was found that high proportion about (59%) of the respondents were not satisfied with solid waste management services provided in Lindi Municipal Council. The study findings revealed that (88%) of penalty imposed to those who breach the solid waste laws and regulation were weak.

5.2 Recommendations

According to results from this study on the factors affecting community participation on solid waste management in Lindi Municipal Council – Tanzania, the following are recommended:

5.2.1 To the Community and Stakeholders

(a) Community members should adhered to the Environmental Policy statement that everybody has the responsibility to make the environment clean through participating in solid waste management services provided in the Municipal Councils.

(b) Ward Executive officers and hamlet chairpersons should emphasis community and other stakeholders in their respective areas on sanitary collection and disposal of waste to the designated place according to existing Municipal Council by-law.

(c) The community should be inform and educated that there are solid waste management rules, regulations and by-law, and penalties will be imposed upon contravene.

5.2.2 To Lindi Municipal Council

(a) The Municipal Council should establish means of educating the community for the purpose of increase understanding important of participating on solid waste collection, storage and disposal.

(b) The Municipal Council should strengthen Environmental Department at the level capable of providing solid waste management services at satisfaction of the community and according to existing rules and regulations.

(c) The proper organization and coordination for the enforcement of rules and regulations of solid waste management should be rouse up in cooperation with CBOs, NGOs and other stakeholder.

(d) The Municipal Council should establish/revival cleaning day operation for the entire community on every Saturday morning as means to ensure everybody is involved in making the municipal Council clean.

(e) The Municipal Council should have vehicle designated for solid waste collection including other necessary equipments and protective gears for solid waste collectors to ensure efficiently operation of the services.

(f) The Municipal Council should keep mechanism in place to ensure every households pay for solid waste management services.

5.2.3 To the Ministry of environment

(a) There is need to establish clear programmes to disseminate and advocate on the adherence to National Environmental policy 1997, Environmental Management Act, 2004 by policy makers at different level of implementation which will help on the adherence and efficiency of enforcement of the existing regulations and by-laws.

(b) There are need to establish separate department of solid waste management at the Council level that conduct day to day implementation of solid waste management including enforcement of solid waste management laws and impose penalties to the violators.

5.2.4 To the Ministry of Health and Social Welfare

(a) Intensive health education programme policy should establish to Municipal and District Councils on the increase public health and environmental threat in malpractice solid waste management.

(b) A clear policy on how the government, privates, CBOs and NGOs institution and company to participating in solid waste management including modernity on how they will pay so as to increase revenue specifically for the solid waste services.

(c) Solid waste management section should separated from health department and establish a full department to enhance effective implementation of solid waste management services in Municipal Councils.

5.2.5 To the Ministry of Education

There should effort to incinerate solid waste management issues in the education curriculum which will cut across at different level of primary and secondary education to increase knowledge and build positive attitude on hygienic solid waste disposal behavior.

5.2.6 To the Ministry of Water

Ministry of water through water authorities should ensure safety and adequate water supply and strengthen liquid waste disposal services.

5.2.6 To the policy Makers

(a) Solid waste management issue should be considered as a permanent agenda in various forums and any other plat form to ensure high coverage to

community so that education on the negative adverse impact that poses threat to public health and environment due to indiscriminate disposal of waste to become known and be practiced.

(b) Local authorities should increase the budget allocated from own sources for solid waste management services including purchasing appropriate vehicles designated for solid waste collection disposal and as well as protective gears for waste collectors.

(c) Local authorities should establish an appropriate paying mechanism for solid waste services in collaboration with the community, NGOs and the private, CBOs to enroll all households within the jurisdiction and to ensure that services are delivered effectively.

5.2.7 Further Research

More study should be conducted on factors affecting community participation on solid waste management including:

(a) Further study with similar nature should be conducted for the wide perspective comparison for the best way of managing solid waste and a model as how solid waste management should be coordinated, developed and implemented.

(b) The same nature of study can be conducted to assess willingness of participate in solid waste management involving different occupation such as employers in formal and informal sectors, consideration of urban and rural setting, including government and private and income earning per month for an individual.

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APPENDICES

Questionnaire

THE OPEN UNIVERSITY OF TANZANIA

QUESTIONNAIRE FOR ASSESSMENT OF COMMUNITY PARTICIPATION IN SOLID WASTES MANAGEMENT IN LINDI MUNICIPALITY

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Degree Programme: Master of Environmental Studies

Introduction

Dear respondent, this questionnaire is intended to facilitate study on the Assessment of Community Participation on Solid Waste Management in Lindi Municipality. I kindly request you to spare your few valuable time to fill it. The information you provide will be treated confidentially and shall be used for research purpose only.

Questionnaire Number: _____

A: Demographic information

Please provide the accurate information about the demographic variables in the table below.

Variables	**Please 'circle' where appropriate**						
Gender	(a) Female				(b) Male		
Age group	(a) 20-25	(b) 26-30	(c) 31-35	(d) 36-40	(e) 41-45	(f) 46-50	(g) >50
Marital Status	(a) Single	(b) Married	(c) Divorced		(d) Separated	(e) Widower	
Education	(a) Without	(b) Primary education	(c) Secondary education	(d) diploma	(e) degree	(f) masters and above	
Years of	(a) 1-3	(b) 4-7	(c) 8-11	(d) 112-	(e) 16-19	(f) >20	

stay In Lindi MC				15		
Size of the family in terms of number	(a) 0-3	(b) 4-6	(c) 7-9	(d) 10-13	(e) 14-16	(f) >16

B: General Information on Solid Waste Management

1. How is your understanding on solid waste management in Lindi Municipality? Please 'circle' your response.

(a)	(b)	(c)	(d)	(e)
I understand very well	I understand Well	I understand not well	I do not understand,	Others/ No Response

2. Please use the rating scale 1-5 as provided below to select an opinion about that you most agree with on each of the aspects.

Ratings: 1-Strongly agree, 2 – Agree, 3 – Undecided, 4 – Disagree, 5 – Strongly disagree

SN		**Your rating (circle)**			
1	Do you know public health problems associated with poor solid waste management.	1	2 3	4	5
2	Municipal Council have the capacity of providing solid waste management services	1	2 3	4	5
3	It is possible for the community to pay for the solid waste management services	1	2 3	4	5
4	Laws and regulations for solid waste management are real imposed to those who not act in accordance with	1	2 3	4	5
5	Community are well educated and informed on solid waste management in their respective areas	1	2 3	4	5

6	Is there any micro and small enterprises that collect solid wastes via door to door system in area	1	2	3	4	5
	Do you think that the location of your house can contribute in preventing smoothly provision of collection of waste door to door	1	2	3	4	5

3. Does your household practice waste separation?

Please 'circle' your response	Yes	No	I do not know

4. .If YES, how do you separate it?

---

5. If NO, what do you think the reason behind?

SN	
A	I do not have the understanding about waste separation
b	I did not think as it is my responsibility
C	I did not visualize the importance of separation
d	if any other reason, please specify it

6. Do you know that your solid waste generation is affected by or related to your consumption pattern?

Please 'circle' your response	Yes	No	I do not know

7. How would you describe your own opinion about solid waste management service provided by the Municipal Council in Lindi?

(a)	(b)	(c)	(d)	(e)
Strongly satisfied	Satisfied	Undecided	Dissatisfied	Strongly dissatisfied

8**.** What are the major solid wastes that your household averagely generates per month? (**Rank** them in terms of higher proportion in volume of all of the wastes)

N		Your rating (circle)				
1	Ash	1	2	3	4	5
2	Food wastes	1	2	3	4	5
3	Wood	1	2	3	4	5
4	Grasses and leaves	1	2	3	4	5
5	Paper	1	2	3	4	5
6	Bones	1	2	3	4	5
7	Metals	1	2	3	4	5
8	Plastics/ textile	1	2	3	4	5

Others specify ……

9. Is there any micro and small enterprises that collect solid wastes via door to door system in your area?

Please 'circle' your response	Yes	No	I do not know

If the answer is No

10. Do you think that the location of your house can contributing from preventing smoothly provision of collection of waste door to door

Please 'circle' your response	Yes	No	I do not know

11. What do you think the main reasons why you did not get the waste collection services Give reason;……..……

……

……

12. What do you do with the solid waste from your household if the municipality truck did not come at the right time and find your temporary storage full

SN		Your rating (circle)				
1	I keep the waste at home until the collectors come by	1	2	3	4	5

	using other storage materials				
2	I burn it in the back of my home	1	2 3	4	5
3	I dump it on open space, which is far from the main road	1	2 3	4	5
4	I dump it in sewerage system	1	2 3	4	5
5	I dump it at the sea shore	1	2 3	4	5
6	I dig a hole around the house and burn it	1	2 3	4	5

13. Who do you think is responsible for solid waste management in Lindi Municipality?

1	The municipality
2	The private waste collectors
3	The households
4	The household and the private waste collectors
5	The municipality and household
6	The municipality and the private waste collectors
7	All of the above bodies/stakeholders are responsible

15. How do you evaluate the efforts made so far by Lindi municipality to provide solid waste management services?

(1) Very good	(2) Good	(3) fair	(4) poor	(5) very poor

16. Do you know that there are rules and regulations of solid wastes in Municipalities?

Please 'circle' your response	Yes	No	I do not know

17.. From your views, Is the Municipal practice rules and regulations in relation to solid waste management?

1. None at all	2.Regulations are weak	3. Regulations are strong	4. I do not know

18 .Have you ever seen when violators of regulation in solid waste management are penalized?

Please 'circle' your response	Yes	No	I do not know

19. If the answer is YES for question no. 18 how do you evaluate the appropriate of the penalty to prevent violators of solid waste management

1. Very strong	2. Strong	3 Fair	4. Weak	5 Very week

20. Are you willing to pay for the waste collection service in order to improve solid waste management

Please 'circle' your response	Yes	No	I do not know

21. At which amount are your willing to pay per month

1. 1000 - 5000/=	2. 6000 – 10,000/=	3. 11,000 – 15,000/=	4. > 16,000/=

22. What are the motives behind for your to pay for solid waste management?

Thank for your cooperation